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Vol. I

TRANSCRIPT OF RECORD

Supreme Court of the United States

OCTOBER TERM, 1935

No. 10, Original

THE STATE OF WYOMING, COMPLAINANT,

vs.

THE STATE OF COLORADO.

IN EQUITY.

FILED OCTOBER 13, 1930.

SUPREME COURT OF THE UNITED STATES

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No. 10, Original

THE STATE OF WYOMING, COMPLAINANT,

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IN EQUITY.

VOL. I.

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Complainant's exhibits:	Original	Print
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41. Skyline Ditch diversions, June, 1926, from Laramie River to the Cache la Poudre River, compiled from weekly reports of Water Commissioner, District No. 3, to Division Engineers at Denver, computed from automatic gauge heighth charts	1413	1009
42. Booklet of U. S. Geological Survey, Water-Supply Paper 469, "Surface Waters of Wyoming and their utilization," by Robert Follansbee (p. 206-211; 224-227) (p. 211-217)	1630	1009
43. Booklet, Supplement "B", Stream Gaging Records, Sixteenth Biennial Report of State Engineer of Wyoming, 1921-1922 (p. 116-117; 128-129; 118-122)	1869	1028
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45. Booklet, Supplement "B", Stream Gaging Records, Eighteenth Biennial Report of State Engineer of Wyoming, 1925-1926 (p. 76-77; 82-83)	2153	1045
46. Booklet, Supplement "B", Stream Gaging Records, Nineteenth Biennial Report of State Engineer of Wyoming, 1927-1928 (p. 78-79)	2249	1049
47. Booklet, Supplement "B", Stream Gaging Records, Twentieth Biennial Report of State Engineer of Wyoming, 1929-1930 (p. 120-121)	2393	1051
48. Booklet, Twenty-first Biennial Report of State Engineer of Wyoming, 1931-1932, Supplement "B", Surface Waters of Wyoming (p. 53-54)	2478	1053
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Complainant's exhibits:	Original	Print
52. Statement, comparative table yearly run-off, of Laramie River at Jelm, Laramie River near Woods, Little Laramie River near Filmore, in acre feet, compiled by Mr. Meeker for years 1905, 1911-1932	2503	1059
53. Statement, comparative table, yearly run-off, of Laramie River at Jelm, Laramie River near Woods, Little Laramie River near Filmore, in acre feet, compiled by Mr. Meeker for years 1923-1932	2504	1059
54. Statement, Water Supply Laramie River Basin, showing average yearly flow and long time means and ten year means compiled by Mr. Meeker from records of U. S. G. S. and by annual reports of Colorado and Wyoming...	2505	1060
55. Statement, comparative table, Water Supply, Laramie River Basin, compiled by Mr. Meeker from automatic gage charts in acre feet ...	2506	1060
56. Pamphlet, Instructions for Installation and tables of discharge for Improved Venturi Flume, published by State Engineer, Denver, 1930	2507	1060
57. Photograph of conditions at Venturi flume, July 11, 1929	2516	1069
58. Photostatic copy, automatic gage chart for week of July 13-20, 1929, at Venturi flume at East Portal, of Laramie-Poudre tunnel	2517	1070
59. Photostatic copy of Current Meter Notes, Engineering Department of Colorado, taken at Venturi flume, Laramie-Poudre tunnel, May 24, 1927, May 25, 1927, August 3, 1929, May 20, 1930, July 4, 1930, August 5, 1930, July, 1932, June 18, July 15, August 15, September 5, September 22, 1932, May 24, 1927	2518	1071
60. Statement by Mr. Meeker of check current meter measurements, at Laramie-Poudre tunnel, Improved Venturi Flume at East Portal, compiled from measurements by and records of State Engineer's office, Denver, for years 1927-1932	2531	1085
61. Photostatic copy of automatic gage chart of Laramie-Poudre tunnel for week of May 1-8, 1926	2532	1087
62. Photostatic copy of original field notes of Water Commissioner for week of May 1-8, 1926. (Comparison made by witness with Exhibit 61)	2533	1088
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64. Photostat, Daily gage height, in feet, and discharge in second feet, of Sand Creek Ditch, rating flume for year ending September 30, 1931	2535	1090

Complainant's exhibits:	Original	Print
65. Photostat, Daily gage height, in feet, and discharge in second feet, of Sand Creek, or Wilson Supply Ditch, at rating flume for year ending September 30, 1932	2536	1091
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67. Two photostatic copies of official gage charts, of State Engineer of Colorado, of water diverted by Sand Creek Ditch from Sand Creek into Sheep Creek	2546	1101
68. Seven photostatic copies of automatic gage charts, from office of State Engineer, Colorado, diversions of water from Sand Creek by the Divide Ditch, during 1925	2548	1103
69. Three photostatic copies of automatic gage charts, from office of State Engineer, Colorado, measurements of water discharged by Divide Ditch from Sand Creek for year 1926	2555	1110
70. Nine photostatic copies of automatic gage charts from State Engineer's office, Colorado, diversion of water by Divide Ditch from Sand Creek for year 1927	2558	1113
71. Three photostatic copies of automatic gage charts from office of State Engineer, Colorado, diversion of water from Sand Creek by Divide Ditch, May 10-May 27, 1928	2567	1122
72. Statement, prepared by Mr. Meeker, "Conditions of Headgates and Rating Flumes, Meadow Ditches from Laramie River and tributaries in Colorado, Water District 48," based on field trip September 16-19, 1932	2569-A	1125
73. Certified copy of Water Commissioner's Ditch Report for Irrigation Season 1927, Water District 48, showing diversions from Laramie River through Greeley-Poudre tunnel and from said river for irrigation of Meadow Lands in Colorado	2570	1127
74. Certified copy, same as No. 73, except as being for year 1928	2573	1129
75. Certified copy, same as No. 73, except as being for year 1929	2576	1131
76. Photostatic copy of P. 58-65 of booklet of Department of the Interior, U. S. G. S., "Contributions to the Hydrology of the United States" for the year 1921, by Nathan C. Grover	2579	1132

Complainant's exhibits:	Original	Print
77. Topographic map of U. S. G. S., Home Quadrangle, Edition of 1920, Relief and Drainage of Headwaters of Laramie River and adjacent territory	2585	1138
78. Two photographs of West collecting canal of Laramie-Poudre tunnel, taken by Mr. Meeker in 1913	2586	1140
79. Two photographs of West collecting canal of Laramie-Poudre tunnel, taken by Mr. Meeker	2587	1141
80. Two photographs of Laramie-Poudre dam, on Laramie River, the dam being unfinished, one looking east near West Portal, and one of water passing through conduit and through old creek bed, both taken by Mr. Meeker	2588	1142
81. Certified copy of records of District Court, Larimer County, Colorado, report of Referee, entitled "In the Matter of the Adjudication of Priorities of Water Rights in District No. 48, Colorado, for Irrigation and Other Uses"	2589	1143
82. Certified copy from District Court, Larimer County, Colorado, of testimony of Abraham I. Akin, in the matter referred to in Exhibit 81	2596	1147
83. Certified copy of Decrees of Water Rights, certified by Mr. Hinderlider, pertaining to Decree of August 7, 1891, Skyline or Laramie River Ditch, District No. 48, and Decree of August 25, 1902; also as to Lower Supply Ditch, August 25, 1902	2604	1154
84. Certified copy of claim No. 73, Rawah and Lower Supply Ditch of Laramie River System, and of Findings and Decree of District Court of Larimer County, Case 2725, in "Matter of the Adjudication of Priorities of Water Rights in Irrigation District No. 48, of the State of Colorado for Irrigation and Other Beneficial Uses," Decree dated February 20, 1914	2608	1154
85. Certified copy of Certificates of Appropriation issued by order of the Board of Control of Wyoming, as recorded on page 236 of Order Record No. 7, entitled "In the matter of the adjudication of priorities of the right of the use of the waters of the Big Laramie River and its tributaries, being Civil Docket No. 8, Nos. 96 to 107, inclusive, in the District Court, First Judicial District, Laramie County, Wyoming," certified to by Mr. Burritt	2614	1160
86. Photostatic copy of memorandum found in files of office of State Engineer, Colorado, signed by Commissioner McAnnely of District 3, purporting to be an official record of diver-		

Complainant's exhibits:	Original	Print
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87. Photostatic copy of official weekly report of Commissioner of District 3, Colorado, for the week ending August 29, 1931, showing diversions of water from District 48 into District 3 and of Laramie-Poudre tunnel and Skyline Ditch	2654	1202
88. Photograph of Improved Venturi Flume at East Portal of Laramie-Poudre tunnel, July 5, 1932, taken by Mr. Parshall	2655	1203
89. Photostatic copy of check current meter measurement made July 5, 1932, at Improved Venturi Flume, East Portal-Laramie-Poudre tunnel, by Mr. Hinderlider	2656	1204
90. Copy of letter from Mr. Hinderlider, dated October 5, 1928, to Agnes Zimmerman, Home, Colorado. Attached is blue print copy of original field notes of check current meter measurement at Improved Venturi Flume, at East Portal of Laramie-Poudre tunnel, made by Bailey of State Engineer's office, Denver	2657	1205
91. Photostatic copy of current meter measurement from Divide Ditch on June 14, 1931, containing original field notes, by Mr. Widman	2660	1206
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97. Memorandum concerning current meter gagings made on the 6-foot Parshall measuring flume at East Portal of Laramie-Poudre Watershed, dated April 14, 1933	2666	1209
98. Comparative table, current meter measurements vs. Venturi Discharge tables, Laramie-		

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99. Graph showing check meter measurements *1927-1933, Laramie-Poudre tunnel, discharge* curve improved Venturi Flume, at East Portal; prepared by Mr. Meeker	2668	1212
100. Six photographs showing flow conditions at Improved Venturi Flume, East Portal Laramie-Poudre tunnel, taken by Mr. Meeker June 24, 1933	2669	1212
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102. Four photographs, taken by Mr. Meeker on June 29, 1933, of conditions on Columbine and Bob Creek Ditches	2671	1212
103. Notes written by Mr. Powell, signed by Mr. Powell and Agnes Zimmerman, relative to amount of water flowing through Laramie-Poudre tunnel on April 9, 1933	2672	1213
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B. Copy of letter, Hinderlider, State Engineer, to Kluver—copies to Portner and Bruce Eaton	2674	1215
C. Letter by L. R. Temple, March 13, 1928, to M. C. Hinderlider	2675	1216
D. Letter from Laramie-Poudre Irrigation Company by H. D. Parker to M. C. Hinderlider on March 16, 1928	2676	1217
E. Letter by Rex C. Eaton, on March 24, 1928, to M. C. Hinderlider	2677	1219
F. Certified copies of findings and decree entered in the matter of adjudication of priority of right to use of water for irrigation in water district No. 48, State of Colorado, in case No. 1247, entered October 30, 1896, by District Court of the 8th Judicial District of Colorado	2678	1220
G. Certified findings and decree in matter of adjudication of priority of right to use of water for irrigation in District 48, State of Colorado, case No. 1885, entered on October 11, 1906	2734	1262
H. Certified findings and decree in matter of adjudication of priority of water rights in irrigation district No. 48, for irrigation and other uses, in case No. 2725, entered on February 20, A. D. 1914, by District Court of Larimer County	2791	1297
I. Map showing plane table sheets	2928	1402

Defendant's exhibits:	Original	Print
J. Maps entitled "Laramie Tunnel Ditches and Feeders," and "Map of Amended Survey of Partially Completed Portion, Ditches and Feeders"	2930	1403
K. Certified copy of Certificate of Incorporation of Larimer County Water Supply Company, filed on January 18, 1878	2932	1407
L. Certified copy of Certificate of Incorporation of the Larimer County Reservoir Irrigating Company, filed on February 12, 1878	2939	1413
M. Certified copy of Certificate of Incorporation of the Larimer County Ditch Co., filed on February 26, 1881	2944	1418
N. Certified copy of Certificate of Incorporation of The Water Supply and Storage Company, filed August 8, 1891; also under same certificate, the certificate of Renewal of the Certificate of Incorporation of the Water Supply and Storage Company, filed on February 14, 1912, and again on February 14, 1933	2951	1425
O. Certificate of Incorporation of the Divide Ditch Company, which was filed on May 22, 1901	2968	1442
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Defendant's exhibits:	Original	Print
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[fol. 1]

IN SUPREME COURT OF THE UNITED STATES

OCTOBER TERM, 1930

In Equity

No.—Original

THE STATE OF WYOMING, Complainant,

vs.

THE STATE OF COLORADO, Defendant

ORIGINAL MOTION FOR LEAVE TO FILE BILL OF COMPLAINT IN EQUITY—Submitted Oct. 6, 1930

To the Honorable The Chief Justice and the Associate Justices of the Supreme Court of the United States:

The State of Wyoming, one of the states of the union of the United States of America, appearing by William O. Wilson, its attorney general, upon the application of Frank C. Emerson, Governor of the State of Wyoming, and in compliance with the request of Honorable John A. Whiting, State Engineer and its Commissioner charged with author-
[fol. 2] ity in relation to interstate streams, respectfully applies for leave to file as an original cause in this court its bill of complaint in equity against the State of Colorado, which bill of complaint is attached hereto and submitted herewith.

The State of Wyoming respectfully shows that in an original proceeding in this court commenced by the State of Wyoming on or about the 29th day of May, A. D. 1911 and reported under the name of Wyoming vs. Colorado in Volume 259, United States Supreme Court Reports, Page 419, wherein this Honorable Court considered and determined the rights of the State of Wyoming and of the State of Colorado, and through said state the rights of the respective citizens, residents and inhabitants thereof, to appropriate and apply to beneficial use the waters of the Laramie River, a stream with its headwaters in the State of Colorado and flowing into and through a portion of the State of Wyoming.

That in the final determination of said court, as found in the decree entered in said original cause, reported in Volume 259, United States Supreme Court Reports, Page 496, it was decreed that the annual available supply of water for appropriation and application to beneficial use from said Laramie River and/or its tributaries was in the amount of 310,250 acre-feet.

That the State of Colorado is entitled to divert, appropriate and use, by means of what is in said decree designated as the Skyline Ditch Diversion, the annual amount of 18,000 acre-feet; the further amount of 4,250 acre-feet annually to be diverted and applied to the irrigation of that number of acres of meadow lands in the State of Colorado; which said appropriations and diversions by said decree were recognized as having a priority over any appropriations in the State of Wyoming;

[fol. 3] That Wyoming had the right to divert, appropriate and apply to beneficial use 272,500 acre-feet of water annually of said stream and/or its tributaries to irrigate 181,500 acres of land in the State of Wyoming; leaving the amount of 15,500 acre-feet available annually for diversion through the Laramie-Poudre Tunnel;

That such findings and determinations by said court as to the use of said waters in said respective amounts should not prejudice the right of the State of Colorado, or of anyone recognized by her as duly entitled thereto, to continue to exercise the right then existing and recognized to divert and take from the headwaters of Deadman Creek, a Colorado tributary of the Laramie River, the relatively small amount of water appropriated therefrom prior to the year 1902 by and through the Wilson Supply Ditch; nor prejudice nor affect the right of the State of Colorado, or the State of Wyoming, or anyone recognized by either state as duly entitled thereto, to continue to exercise the right to divert and use water from Sand Creek, sometimes spoken of as a tributary of Laramie River; in virtue of any then existing and lawful appropriation of waters of said creek;

That notwithstanding such findings and determinations by this Honorable Court as to the rights of the State of Colorado and the State of Wyoming to divert and appropriate to beneficial use the waters of said Laramie River

and/or its tributaries in the manner and amount as in said final decree stated, which said decree is found, made and entered, in said original cause, and reported in Volume 259, United States Supreme Court Reports, Page 496, wherein the amount of water available for appropriation for the State of Colorado was found, stated and limited to an aggregate amount of 37,750 acre-feet to be diverted annually by means of the several diversions as recognized in said [fol. 4] decree, the State of Colorado is now and has been for a period of many years last past, and threatens to continue, acting through its officers, agents and representatives, making excessive, additional and/or unlawful diversions of water from the watershed of said Laramie River and/or its tributaries; and through its officers and agents authorize and permit the users of water from such unlawful diversion to have adjudicated to them, and for their benefit decrees recognizing and allowing the continuance of such unlawful diversions, which are accomplished by means of the following storage and diversions, to-wit: the Bob Creek ditch; Lost Lake Reservoir system, consisting of Laramie Lake, Lost Lake, Lily Lake and Twin Lakes, the Deadman Ditch Feeder or Wilson Supply ditch; the Deadman Extension Ditch, and the Divide Ditch, and the Skyline Ditch; and the excessive or unrecorded Laramie-Poudre Tunnel diversions, and used to carry such diverted waters over into the Cache la Poudre River for use in the State of Colorado; and also all excessive and unrecorded diversions on the meadow lands in Colorado.

The State of Wyoming now prays leave to file its Bill in Equity in this court and bring to the attention of this court the matters as in its Bill of Complaint set forth and complained of against the State of Colorado, to the end that this court will prevent the continuance of such unlawful diversions of the waters of said Laramie River and/or its tributaries, and prevent further loss and damage to the State of Wyoming and to its citizens, residents and inhabitants by enabling said State of Wyoming to have for the use and benefit of its citizens, residents and inhabitants the waters from said river and/or its tributaries in accordance with the terms of the decree of this court, as determined in said original proceeding in this court heretofore referred to.

[fol. 5] Wherefore the State of Wyoming prays leave to file its original Bill of Complaint as above stated.

Respectfully submitted, The State of Wyoming, by William O. Wilson, Attorney General of the State of Wyoming; James A. Greenwood, Deputy Attorney General of the State of Wyoming; Richard J. Jackson, Assistant Attorney General of the State of Wyoming; Philip S. Garbutt, Assistant Attorney General of the State of Wyoming.

[File endorsement omitted.]

[fols. 6 & 7] Supreme Court of the United States

[Title omitted]

Order Allowing Motion for Leave to File Bill of Complaint—Filed Oct. 13, 1930

On consideration of the motion for leave to file the bill of complaint in this cause,

It is now here ordered by the Court that the said motion be, and the same is hereby, granted, and process is ordered to issue returnable on Monday, January 5, 1931.

[File endorsement omitted.]

[fols. 8 & 9] [File endorsement omitted.]

In Supreme Court of the United States

October Term, 1930

No. 20—Original

The State of Wyoming, Complainant,

vs.

The State of Colorado, Defendant.

Bill of Complaint in Equity—Filed Oct. 13, 1930

To the Honorable, the Chief Justice and Associate Justices of the Supreme Court of the United States:

The State of Wyoming, by William O. Wilson, Attorney General of the State, under the direction of the Honorable

Frank C. Emerson, Governor of the State, and in compliance with the request of the Honorable John A. Whiting, State Engineer of the State, and its Commissioner charged with authority in relation to interstate streams, by leave of this Honorable Court first had and obtained, brings this, [fol. 10] its original bill of complaint, in its own behalf and that of its officials, agents, servants, and other citizens, residents and corporations, against the State of Colorado in its own behalf and that of its officials, agents, servants, representatives and other citizens, residents and corporations; and respectfully sets forth and alleges, as its first cause of action:

First

That your complainant is one of the states of the United States entitled to enjoy all the privileges, rights and powers, and with all the duties, including the duty of protecting the rights, interests and property of its citizens and residents possessed or developed upon each and all of said states of the United States of America.

Second

That the State of Colorado is likewise one of the states constituting the United States of America entitled to enjoy all the privileges, rights and powers, and with all the duties, including the duty of protecting the rights, interests and property of its citizens and residents possessed and devolving upon each and all of said states of the United States of America.

Third

That on May twenty-ninth, A. D. 1911, an original suit in equity was instituted in this Honorable Court, by the above named complainant, the State of Wyoming, against the State of Colorado and the Greeley-Poudre Irrigation District and the Laramie-Poudre Reservoirs & Irrigation Company, to prevent a proposed diversion in Colorado of part of the waters of the Laramie River, an interstate stream; the opinion in said case rendered June 5, 1922, appearing in Vol. 259, [fol. 11] U. S. Reports, page 419; 66 Law Edition, page 999; and the modified decree therein entered Oct. 9, 1922, appearing in said 259 U. S. Reports, page 496; 66 Law Edition, page 1026.

Fourth

That it was found and determined in said case that the said Laramie is an unnavigable river which has its source in the mountains of northern Colorado, flows northerly twenty-seven miles in that state, crosses into Wyoming, and there flows northerly and northeasterly one hundred and fifty miles to the North Platte river, of which it is a tributary; and that both Colorado and Wyoming are in the arid region where flowing waters are, and long have been, commonly diverted from their natural channels and used in irrigating the soil and making it productive; and that for many years some of the waters of the Laramie river have benn subjected to such diversion and use, part in Colorado and part in Wyoming.

Fifth

That this Honorable Court further found the entire water supply available for the proposed Colorado appropriation and the Wyoming appropriations shown to and including the diversion for the Wheatland district is 288,000 acre-feet per annum; and that there are some existing Colorado appropriations having priorities entitling them to precedence over many of the Wyoming appropriations; that these recognized Colorado appropriations are 18,000 acre-feet to be diverted by what is known as the Skyline ditch diversion, and 4,250 acre-feet for the irrigation of that number of acres of native-hay meadows in the Laramie valley in Colorado; and that these recognized Colorado appropriations, aggregating 22,250 acre-feet, were not to be deducted from [fol. 12] the 288,000 acre-feet, that being the available annual supply after they are satisfied; and that thus the total available annual supply of water for irrigation, in Wyoming and Colorado out of the waters of the Laramie river and its tributaries, was said 288,000 acre-feet of water, and said 22,250 acre-feet of water; or a total available annual supply of water for irrigation of lands in Colorado and Wyoming from the Laramie river and its tributaries in the total sum of 310,250 acre-feet of water; in addition to the waters of Sand Creek, which rises in Colorado and extends into the Laramie plains in Wyoming, and discharges into Hutton Lake, a few miles from the Laramie River, and the waters of which creek, for reasons stated in the opinion, were not

regarded by this Honorable Court as a factor in the controversy;

Sixth

That this Honorable Court further found and determined that the evidence showed that the Wyoming appropriations having priorities senior to the one in Colorado, and which are dependent on the available water supply before named, cover 181,500 acres of land, and that the amount of water appropriated and reasonably required for the irrigation of said lands is 272,500 acre-feet; that a much larger amount was claimed, but the findings of the court restricted the amount to what the evidence showed was reasonably required; and that as the available supply is 288,000 acre-feet, and the amount covered by senior appropriations in Wyoming is 272,500 acre-feet, there remains 15,500 acre-feet which are subject to the junior appropriation in Colorado, to-wit: the Laramie-Poudre Tunnel appropriation.

[fol. 13] Seventh

That in and by its final decree, this Honorable Court then considered, ordered and decreed, that the defendants, their officers, agents and servants be, and they were thereby, severally enjoined from diverting or taking from the Laramie River and its tributaries in the State of Colorado, more than fifteen thousand five hundred (15,500) acre-feet of water per annum, in virtue of or through what is designated in the pleadings and evidence as the Laramie-Poudre tunnel appropriation in that state; and provided therein that said decree should not prejudice the right of the State of Colorado, or of anyone recognized by her as duly entitled thereto, to continue to exercise the right existing and thereby recognized to divert and take from such stream and its tributaries in that state the following:

(1) Eigh-een thousand (18,000) acre-feet of water per annum in virtue of and through said Skyline ditch appropriation in that state;

(2) Four thousand two hundred and fifty (4,250) acre-feet of water per annum in virtue of and through the meadow-land appropriations in that state;

(3) The relatively small amount of water appropriated from the headwaters of Deadman Creek, a Colorado tribu-

tary of the Laramie River, prior to the year 1902, by and through what is designated in the evidence as the Wilson Supply Ditch; and

(4) That the decree should not prejudice or affect the right of the State of Colorado or the State of Wyoming, or anyone recognized by either state as duly entitled thereto, to continue to exercise the right to divert and use water from Sand Creek, sometimes spoken of as a tributary of the Laramie River, by virtue of any existing and lawful appropriation of the waters of such creek.

[fol. 14] Eighth

That plaintiff has been reliably informed, and therefore on information and belief alleges the fact to be that the gauging and measuring devices installed by the defendant do not accurately gauge and measure the full amount of water diverted by means of and through the designated lawful diversions as defined in the said decree of this Honorable Court.

Ninth

That the State of Colorado, as your complainant is informed and believes, and therefore alleges the fact to be, has permitted water to be diverted from the Laramie River and its tributaries by means of and through the Laramie-Poudre tunnel diversion in excess of 15,500 acre-feet per annum; that during portions of the year 1926, there were, as shown by the official records of Colorado, diversions through said tunnel of 13,572 acre-feet, and unreported diversions through said tunnel in the amount of over 3,000 acre-feet, making a total diversion for the year 1926 in excess of the amount of 15,000 acre-feet as provided in said decree; that such measurements, on which complainant has relied, are from the records certified by the State Engineer of Colorado; based on records of the water commissioner of the district, who compiled the original record of measurements; that, however, the records of the division engineer, certified to by him, show the diversion of 5644 acre-feet, instead of 13,572 acre-feet, of water;

Tenth

That through, by and under said decree, the State of Wyoming was found by this Honorable Court to be entitled

to an amount of water for the purpose of irrigating lands in said state far in excess of the amount of water to which [fol. 15] the State of Colorado was entitled, for the purpose of irrigating lands in the State of Colorado; and therefore has a vital interest in the appropriations, diversion and measurement of the waters of the Laramie river and its tributaries in Colorado, and should therefore be permitted to install its own standard gauging devices and make its own measurements of diversion of water from said Laramie River and its tributaries in Colorado; yet Colorado, though requested in writing by Wyoming for such permission, denied such request; and that, therefore, all allegations herein as to the measurements of water and the quantities are necessarily dependent on the gauging devices and measurements and records thereof as kept by Colorado and its officials.

Eleventh

That the State of Colorado has, in the manner and by the means hereinafter alleged, violated and disregarded said decree and the terms thereof; and the injunction therein contained against the excessive or otherwise unlawful diversions, of water, as hereinafter described;

Twelfth

That during the following years there was diverted in the State of Colorado by its officials, agents, representatives, and other citizens and residents, by and with the knowledge, consent, permission, and cooperation of the said State of Colorado, and its officials, agents, representatives and servants, from the Laramie River and its tributaries in Colorado, to the Cache La Poudre River, for the irrigation of lands in Colorado, the following amounts of water in excess of the 18,000 acre-feet of water, being the amount authorized so to be diverted under said decree of this Honorable Court by said Skyline Ditch, to-wit:

[fol. 16] (1) During the year 1927, 22,150 acre-feet of water, or 4,150 acre-feet in excess of the annual amount of water authorized by said decree thus to be diverted;

(2) During the year 1928, 19,397 acre-feet of water, or 1,397 acre-feet in excess of the annual amount of water authorized by said decree thus to be diverted;

(3) During the year 1929, 24,363 acre-feet of water, or 6,363 acre-feet of water in excess of the annual amount authorized by said decree thus to be diverted.

Thirteenth

That during the following years there was diverted in the State of Colorado by its officials, agents, representatives, and other citizens and residents, and corporations, by and with the knowledge, consent and cooperation of the said State of Colorado, and its officials, agents, representatives and servants, from the Laramie River and its tributaries in Colorado, the following amounts of water in excess of the amount authorized under said decree to be diverted for the purpose of irrigating 4,250 acres of meadow land in the State of Colorado:

(1) During the year 1926, 61,767 acre-feet of water, or 57,517 acre-feet of water in excess of the annual amount authorized by said decree thus diverted, which was used to irrigate 6,162 acres of natural hay meadows.

(2) During the year 1927, 54,152 acre-feet of water, or 59,902 acre-feet of water in excess of the annual amount authorized by said decree thus diverted, which was used to irrigate 5,517 acres of natural hay meadows.

(3) During the year 1928, 56,275 acre-feet of water, or 52,025 acre-feet of water in excess of the annual amount authorized by said decree thus diverted, which was used to irrigate 6,767 acres of natural hay meadows.

(4) During the year 1929, 58,772 acre-feet of water, or [fol. 17] 54,522 acre-feet of water in excess of the annual amount auhorized by said decree thus diverted, which was used to irrigate 6,792 acres of natural hay meadows.

Fourteenth

That in addition to the excessive and unlawful diversions in violation of said decree of this Honorable Court, as above alleged, the State of Colorado, by its officials, agents and servants, and by and with the knowledge, consent and cooperation of the said State of Colorado, and its officials, agents and servants, has permitted the following unlawful and/or excessive trans-mountain diversions of water to be made from the Laramie River and its tributaries in Colo-

rado through the Bob Creek ditch; Lost Lake Reservoir System; Columbine ditch; the Deadman Ditch Feeder or Wilson Supply Ditch; the Divide ditch; and the Deadman Extension Ditch; to the watershed of the Cache La Poudre River for the irrigation of lands in Colorado, contrary to and in violation and disregard of the terms of said decree of this Honorable Court, as follows:

1. The Bob Creek ditch as constructed, heads north fifty-eight degrees fifty-six minutes west three thousand and five (3005) feet from the quarter corner between sections three and ten, in township nine north of range seventy-five west of the sixth principal meridian; that from this point it has a northeasterly course to near the center of section three; thence in a southeasterly course through the southeast quarter of section three and the southwest quarter of the southwest quarter of section two; thence in a southeasterly course through the north one-half of section eleven in said township and range, emptying into Roaring Fork, a Colorado tributary of the Cache La Poudre River, in the southwest quarter of the northeast quarter of section eleven, in said township and range; that the length of the ditch is [fol. 18] two and one-half miles, that the cross section shows a bottom width of four feet capable of carrying two feet depth of water, eight feet wide at two-foot water level; that it has a fall of five feet per mile, with an approximate carrying capacity of thirty-six second feet of water;

2. That a small ditch eight hundred (800) feet long has been constructed across a marsh to divert water into Bob Creek Ditch about the southeast quarter of the northwest quarter of section eleven, township nine north of said range; that the sources of supply of said Bob Creek ditch are several tributaries of Nunn Creek, and that the water then flows into Roaring Fork Creek, a tributary of the Cache La Poudre River; and thus the water is thereby unlawfully diverted from the Laramie River and its tributaries into the Cache La Poudre watershed for the irrigation of lands in Colorado, contrary to and in violation and disregard of the terms of the said decree of this Honorable Court; and that the records of such unlawful diversions as kept by Colorado officials are as follows:

(1) In the year 1922, 512 acre-feet;
(2) In the year 1923, 1174 acre-feet;
(3) In the year 1924, 0 acre-feet;

(4) In the year 1925, 745 acre-feet;
(5) In the year 1926, 0 acre-feet;
(6) In the year 1927, 1044 acre-feet;
(7) In the year 1928, 535 acre-feet;
(8) In the year 1929, 1153 acre-feet.

That there is also an unfinished extension ditch to said Bob Creek ditch:

3. The Columbine ditch is located in sections twenty-six and thirty-five, township ten north of said range, in the State of Colorado; that the length of the ditch is one and three-tenths (1.3) miles; that the ditch has an average cross section of four-foot bottom, six feet at water level, with a [fol. 19] depth of two feet, and a slope of five feet per mile; that its approximate carrying capacity is thirty second feet; that its source of supply is Columbine Creek or a branch of it being tributaries of the Laramie River; that the greater part of the water being carried by it is the early run-off; that the water from the said Columbine ditch is discharged into a branch of the North Poudre river, and thence into the Poudre River watershed, for the irrigation of lands in Colorado, contrary to and in violation and disregard of the terms of the said decree of this Honorable Court; and that the records of such unlawful diversions have been kept by the officials of Colorado, as follows:

(1) In the year 1922, 181 acre-feet;
(2) In the year 1923, 332 acre-feet;
(3) In the year 1924, 0 acre-feet;
(4) In the year 1925, 259 acre-feet;
(5) In the year 1926, 0 acre-feet;
(6) In the year 1927, 376 acre-feet;
(7) In the year 1928, 373 acre-feet;
(8) In the year 1929, 590 acre-feet.

4. The Lost Lake system is composed of five lakes: Lost Lake, Laramie Lake, Lily Lake, and the Twin Lakes; but that three of such lakes only are used for storing water, to-wit: Lost Lake, Laramie Lake and Lily Lake; their capacity being 806 acre-feet of water:

(1) Lost Lake, which is located in the northeast quarter of section six, in township seven north of said range, and in the southeast quarter of section thirty-one in township eight north of said range;

(2) Laramie Lake, which is located in the northwest quarter of the southwest quarter, and the southwest quarter of the northwest quarter of section thirty-two, in township eight north of said range; that a ditch has been constructed in order that the water from the Laramie Lake will [fol. 20] flow into Lost Lake, and thence into Chambers Lake situated at the head of the Cache La Poudre River, into which river it flows;

(3) Lily Lake, which is located near the center of section twenty-nine, in township eight north of said range; that the water from Lily Lake flows down a natural channel to Laramie Lake;

(4) Twin Lakes, which are located in the northwest quarter of section twenty-nine, in township eight north of said range; that such lakes have no dike to hold water as the other three lakes of the Lost Lake system have; but a ditch has been constructed to drain these lakes which flows into a natural channel into Laramie Lake;

(5) That the sources of supply of said Lost Lake system are unnamed tributaries of the Laramie River; and that the water flows therefrom into said Chambers Lake; that all the water stored in these lakes would flow into the Laramie River if the dams and ditches did not cause the water to flow into Chambers Lake, thence into the Cache La Poudre River; and thus the water is thereby unlawfully diverted from the Laramie River and its tributaries into the Cache La Poudre watershed for the irrigation of lands in Colorado, contrary to and in violation and disregard of the terms of the said decree of this Honorable Court; and that the only record of the water diverted by the officials of Colorado shows that in the year 1926, 448 acre-feet were thus unlawfully diverted;

5. The Deadman Ditch Feeder, or Wilson Supply Ditch, has its headgate in the southeast quarter of section fifteen, township ten north of said range; and runs in a northwesterly course; is one and three-tenth (1.3) miles long, with [fol. 21] a five-foot fall per mile; has a cross section of eight-foot bottom, three feet depth of water, thirteen feet across at water level, carrying capacity of approximately one hundred and thirty second-feet; its main source of water is Deadman Creek or a tributary to it; and the water

flows through this ditch into Sand Creek, and from Sand Creek is diverted by the Divide ditch, sometimes also known as the Wilson Supply ditch, into Sheep Creek, a tributary of the North Cache La Poudre River, which flows into the Cache La Poudre River, for the irrigation of lands in Colorado;

6. The Deadman Extension ditch is an extension of the Deadman ditch Feeder or Wilson Supply ditch, running to the south to intercept several small streams; that it extends from the Deadman Feeder ditch in the southwest quarter of section fourteen, in township ten north of said range, in a general southerly direction through the east half of section twenty-two and the west half of section twenty-three, diverting water from two small streams in the west half of said section twenty-three; and the ditch is extended a short distance beyond the point where the water is diverted in the southwest quarter of said section twenty-three.

7. That an examination of said Deadman Extension ditch in 1929 disclosed that a survey of the ditch had been made for an enlargement; the slope stakes being set for enlarging the ditch from a three-foot bottom to a six-foot bottom; that the point where the enlargement stakes were set was north thirteen degrees east six hundred feet from the southwest corner of section fourteen, in township ten north of said range; thence in a southwesterly course thirty-two hundred feet; thence in a southeasterly course about twenty-four hundred feet to a branch of Deadman Creek; passing through the southwest quarter of the southwest quarter of section fourteen; thence through the south- [fol. 22] east quarter of the southeast quarter of section fifteen; thence through the northeast quarter of section twenty-two, ending in the southwest quarter of the northwest quarter of section twenty-three; all in said township ten north of said range;

8. That an enlargement based on such survey was made in the fall of 1929; and in 1930 it was disclosed that said ditch had been recently constructed to a six-foot bottom; that the ditch can, as reconstructed and enlarged, carry a two-foot depth of water with a two-foot freeboard; that the slope or fall per mile is approximately five feet; that the ditch is capable of carrying forty-eight second feet of

water; that part of the ditch carrying water last year has not been enlarged this year.

Fifteenth

That in and by the Decree of this Honorable Court, as heretofore alleged, it was provided that said decree should not prejudice the right of the State of Colorado, or of anyone recognized by her as duly entitled thereto, to continue to exercise the right then existing and thereby recognized to divert and take from such stream (Laramie) and its tributaries the relatively small amount of water appropriated from the headwaters of Deadman Creek, a Colorado tributary of the Laramie River, prior to the year 1902, by and through what is designated in the evidence as the Wilson Supply Ditch; that insofar as said evtension and enlargement of said Wilson Supply Ditch, otherwise known as the Deadman Feeder ditch to the Wilson Supply Ditch, together with the Divide Ditch, divert more than the relatively small amount of water appropriated from the headwaters of Deadman Creek, prior to the year 1902, by and through what was designated in said decree as the Wilson Supply ditch, such enlargement has been done con-
[fol. 23] trary to and in violation and disregard of the decree of this Honorable Court, and for the purpose of increasing the amount of water thus diverted.

Sixteenth

That there are pending at this time in the district court of Larimer County, Colorado, applications filed July 12, 1926 on behalf of the Water Supply and Storage Company, as owner, of said Laramie Lake, Lost Lake and Lily Lake, referred to therein as reservoirs, for the purpose of having decreed to said owner, authority under the laws of Colorado, to divert and store water for irrigation purposes in said reservoirs; in the amount and capacity in the petitions filed therein set forth; the petitions alleging further that said Laramie reservoir has an area of forty-seven acres, and an estimated capacity of 14,817,744 cubic feet of water; that said Lost Loke reservoir has an area of twenty-six acres, and an estimated capacity of 12,541,030 cubic feet of water; that said Lily Lake reservoir has an area of fifty-nine and five-tenths acres, and an estimated capacity of 7,747,189 cubic feet of water;

Seventeenth

That there is also pending in the said district court of Larimer County, Colorado, the application filed July 12, 1926 of the Mountain and Plains Irrigation Company, owner of the Bob Creek ditch, for the purpose of having decreed to it an adjudication of priority to waters to be diverted from the Laramie River Basin by means of said Bob Creek ditch diversion, sometimes known as Nunn Creek ditch; said petition alleging as follows: That said ditch begins in section three and ends in section two, in township nine north of said range; that it is eight thousand [fol. 24] one hundred and thirty feet (8130) long, with a carrying capacity of one hundred cubic feet per second of time; that as a part of said Bob Creek ditch, a feeder ditch was constructed, located in said section two; and also that the Bob Creek Extension ditch across the channel of said Bob Creek, also sometimes known as Nunn Creek ditch, is completed to a distance of approximately six thousand feet, and has a carrying capacity of fifty cubic feet per second of time; and that said Bob Creek ditch and said Bob Creek Extension ditch are used for the irrigation of agricultural lands in the counties of Larimer and Weld in the State of Colorado, the number of acres not being alleged; and that said applications for said decrees are now pending before referees.

Eighteenth

That a topographical map of the watershed of the Laramie river and its tributaries in Colorado, showing the location of the diversions, described herein, is attached hereto, marked "Exhibit A" and hereby expressly made a part hereof;

Nineteenth

That officials of the State of Wyoming, charged with the supervision of the waters of the state and of their appropriation, diversion and distribution, have conferred with like officials of the State of Colorado, and have protested orally against such excessive or otherwise unlawful diversions of water from the Laramie River and its tributaries in Colorado, for the irrigation of lands in Colorado, contrary to and in violation and disregard of said decree of this Honorable Court; but such officials of Colorado have

denied that any such excessive or otherwise unlawful diversions existed; and that such officials in Wyoming further protested in writing to the said officials of Colorado against [fol. 25] such excessive and otherwise unlawful diversions; and such officials of Colorado replied in writing that they were unable to find that Colorado or her citizens had violated the decree of this Honorable Court, and were at all times willing and anxious to abide by the terms thereof, and requested a conference of such officials, which was accordingly held on September 26th, A. D. 1930; and that at such conference the assertion on behalf of Wyoming, of such excessive and otherwise unlawful diversions of water by and on behalf of Colorado, as herein alleged, was denied by and on behalf of Colorado; and that, therefore, your complainant is without relief from such excessive and otherwise unlawful diversions of water, except through and by the order, judgment and decree of this Honorable Court.

Twentieth

That furthermore, the State of Colorado, unless restrained by this Honorable Court, will, through its officials, agents, representatives, servants, or other citizens or residents, or its corporations, continue to increase the diversion of waters from the Laramie River and its tributaries for the irrigation of lands in Colorado; and unless restrained, will continue until the amount of water determined by the decree of this Honorable Court as being available to Wyoming for the water users in Wyoming, to-wit: 272,500 acre-feet, will be gradually reduced and finally consumed, and Wyoming and its citizens, residents and corporations will be deprived of any protection under the said decree to the use of the waters to which it was determined by said decree to be entitled, and that annually since the entry of said decree, the amount of water available to the State of Wyoming for its water users has been less than said 272,500 acre-feet of water per annum; caused by reason of said excessive and otherwise unlawful diversions;

[fol. 26] Twenty-first

Your complainant, the State of Wyoming, offers to do full and complete equity to the State of Colorado in respect to the administration, diversion and use of the waters of

the Laramie River and its tributaries; but this complainant alleges that no other court than this Honorable Court, upon the general doctrines of law, or the constitution of the United States, or under the specific adjudication and decree and the governing principles set forth in the said case of Wyoming vs. Colorado, et al., has any authority or jurisdiction whatsoever to adjudicate upon the matters which were adjudicated in said decree in said case; and furthermore, that Colorado, and through it, its officials, agents, representatives, servants, and other citizens and residents, and its corporations, should be required by this Honorable Court to abide by the terms of said decree, and be prevented by this Honorable Court from any violation of the terms thereof.

Twenty-second

Your complainant has no adequate remedy at law, nor any remedy at law, nor any remedy in any court whatsoever, except this Supreme Court of the United States in respect to the matters and things herein set forth and alleged.

[fol. 27] Second Cause of Action

The State of Wyoming by William O. Wilson, Attorney General of the State, under the direction of the Honorable Frank C. Emerson, Governor of the State, and in compliance with the request of the Honorable John A. Whiting, State Engineer of the State and its Commissioner charged with authority in relation to interstate streams, by leave of this Honorable Court first had and obtained, brings this its original bill of complaint, in its own behalf and that of its officials, agents, servants, and other citizens and residents and corporations, against the State of Colorado, in its own behalf, and that of its officials, agents, servants, representatives and other citizens, residents and corporations, and respectfully and fully sets forth and alleges as and for its second cause of action:

First

Complainant refers to all matters and things alleged and set forth in paragraphs numbered first to twenty-first both inclusive of this petition, and makes all of the said matters and things alleged in said paragraphs numbered first to twenty-first both inclusive of said first cause of action, a part of this its second cause of action, with the same effect

and to all intents and purposes, as though herein specifically set forth and alleged herein.

Second

That the State of Wyoming made request on March 8, 1928, in writing, of the State of Colorado for permission to install measuring devices in order to make an inventory of such waters in Colorado, jointly with Colorado and with the United States Geological Survey, such inventory to be made [fol. 28] by Wyoming, at its own expense; but that this request was denied in writing on April 5, 1928, by the State of Colorado, and that by reason of such refusal, Wyoming, with a greater interest than Colorado in the said waters of the Laramie River watershed, by virtue of the said decree of this court, is compelled to rely on the measurements made by Colorado.

Third

That, therefore, the State of Wyoming should be permitted by means of the order of this Honorable Court, to install gauging devices in the State of Colorado, in the Laramie River and its tributaries and in any transmountain ditches, lakes and reservoirs by means of which water is being or may be diverted from said Laramie River and its tributaries in the State of Colorado to the Poudre River basin; and to take any and all measurements therefrom for the purpose of ascertaining the amount of water being appropriated and diverted from said Laramie River and its tributaries, for the irrigation of lands in Colorado, or that such installation of gauges, and measuring of such waters should be carried on by the Federal Government, at the expense of the said states.

Fourth

Your complainant, the State of Wyoming, offers to do full and complete equity to the State of Colorado in respect to the matters and things in this cause of action alleged.

[fol. 29]

Fifth

Your complainant has no adequate remedy at law, or any remedy at law, nor any remedy in any court whatsoever except this Supreme Court of the United States in respect to the matters and things herein set forth and alleged.

Wherefore the State of Wyoming prays as to its first and second causes of action herein that this Honorable Court

may cause its subpoena or other proper process to issue under the seal of this Court, summoning the State of Colorado, as defendant to appear herein, present its answer, if any, and abide by the determination of this Court; and that this Honorable Court may exercise its sole jurisdiction over the determination of the use of the waters of the Laramie river and its tributaries, and protect and quiet the rights of the State of Wyoming, its officers, agents, representatives or other citizens and residents, and its corporations, under the adjudication and decree in said case of Wyoming vs. Colorado, et al.; and also that the State of Wyoming be permitted to install standard gauging devices, and take any and all such requisite measurements of water, and make records thereof, as heretofore alleged; or that such installation of gauges and measuring and recording of such waters be carried on by the Federal Government, and that in the event the said court shall find in and by said decree that the injunction entered therein applied only to the diversion by the State of Colorado of the waters through the Laramie-Poudre Tunnel, that this Honorable Court may, temporarily, during the pendency of this cause, and permanently, on the final determination hereof, enjoin the said State of Colorado, and through it or otherwise, as the court may determine, its officers, agents, representatives or servants, or other persons or citizens and its corporations, from diverting any water from said Laramie River and its tributaries in Colorado for the irrigation of lands in Colorado, in excess [fol. 30] of the available quantities of water allotted to Colorado in and by said decree; or from further adjudication thereon in the Courts of Colorado; and that this Honorable Court give and grant such other full, further, or different relief as may be just and equitable.

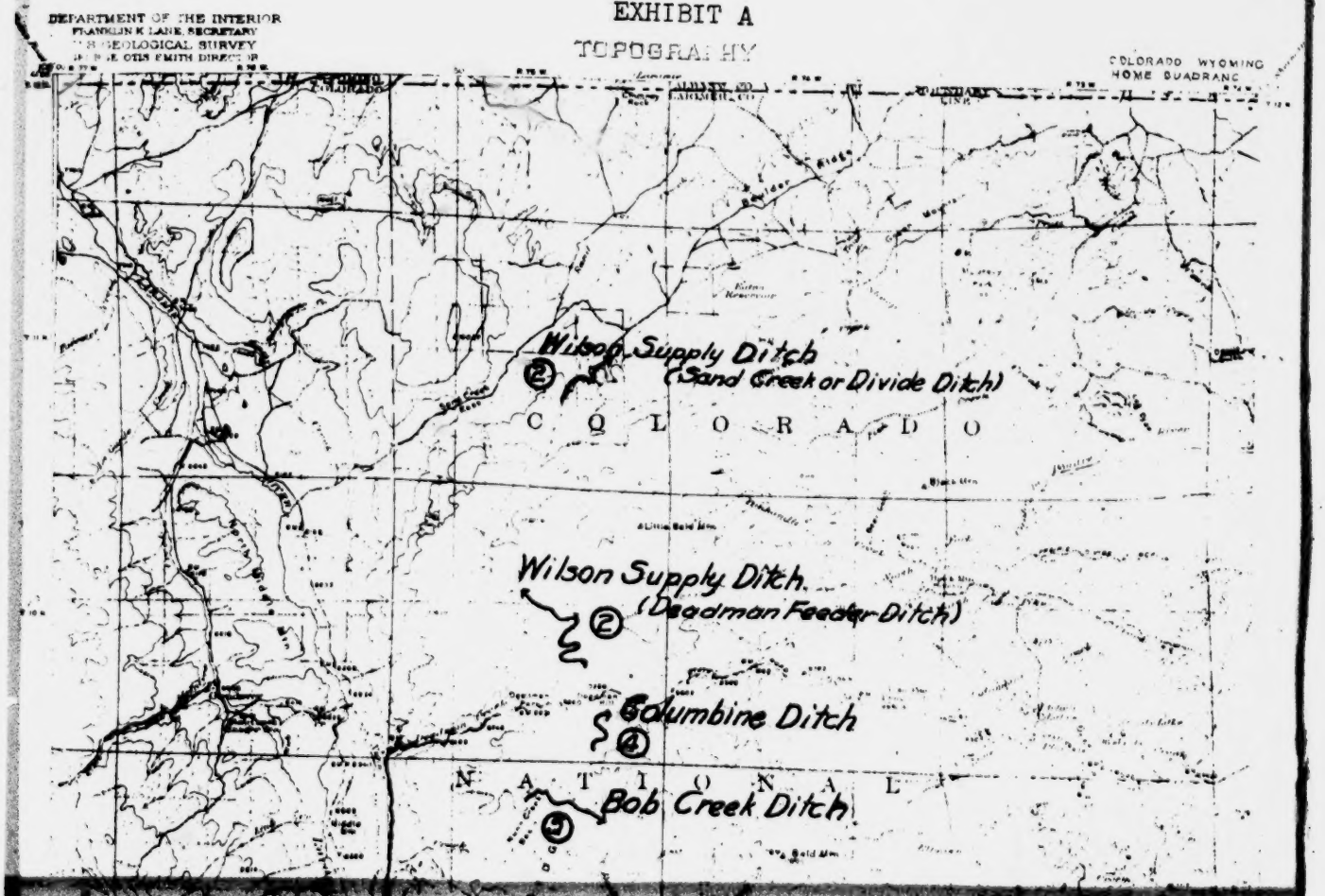
The State of Wyoming by William O. Wilson, Attorney General of the State of Wyoming; James A. Greenwood, Deputy Attorney General; Richard J. Jackson, Assistant Attorney General; Philip S. Garbutt, Assistant Attorney General, Solicitors for Complainant.

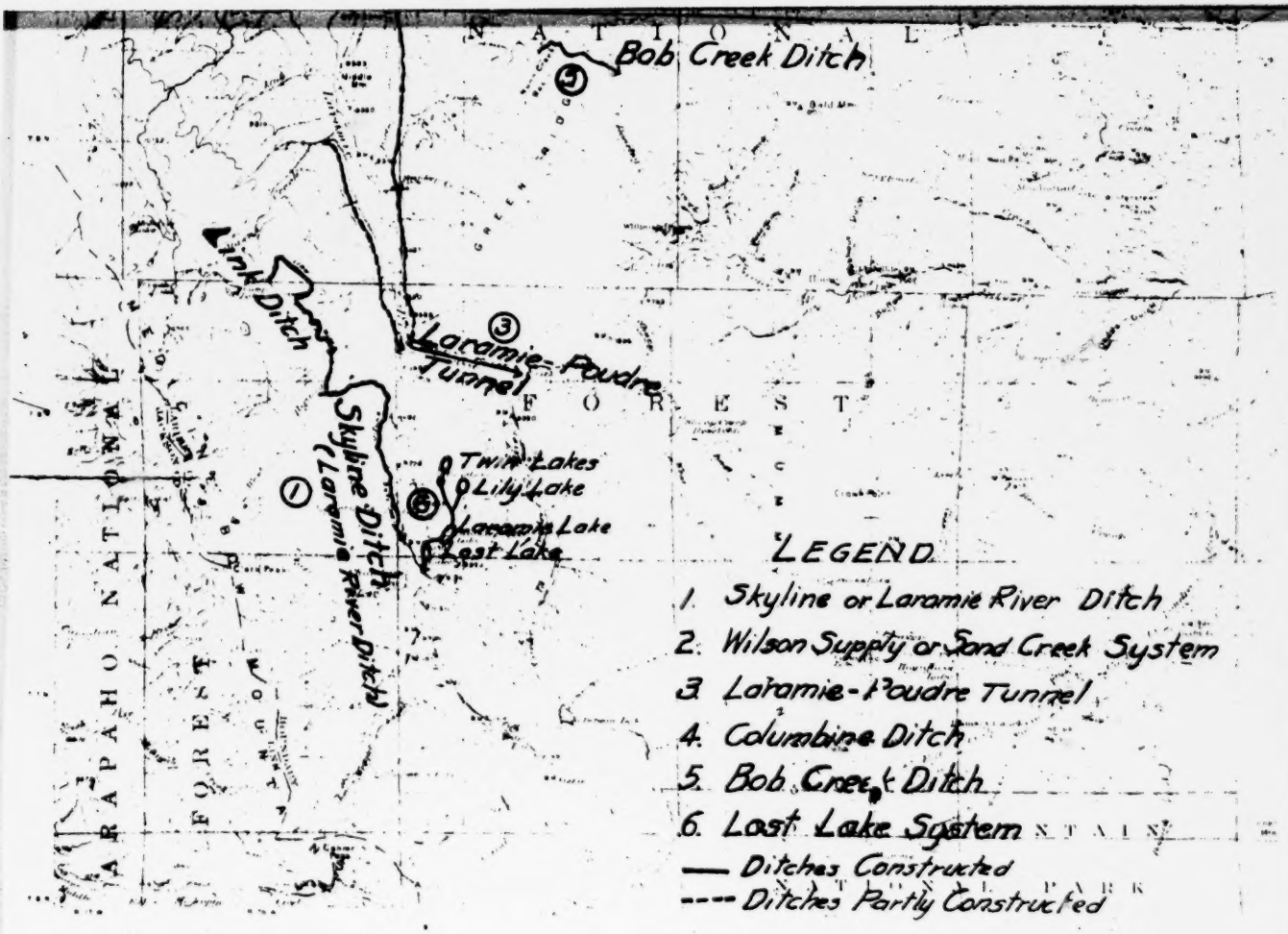
[fols. 31 & 32] *Duly sworn to by William O. Wilson. Jurat omitted in printing.*

(Here follows photolithograph of map, Exhibit A, side folio 33.)

EXHIBIT A

TOPOGRAPHY




Bob Creek Ditch
Link Ditch
Laramie-Poudre Tunnel
Skyline Ditch (Laramie River Ditch)
Twin Lakes
Lily Lake
Laramie Lake
Last Lake
ARAPAHO NATIONAL FOREST
LEGEND
1. Skyline or Laramie River Ditch
2. Wilson Supply or Sand Creek System
3. Laramie-Poudre Tunnel
4. Columbine Ditch
5. Bob Creek Ditch
6. Last Lake System
—— Ditches Constructed
---- Ditches Partly Constructed

[fols. 34 & 35] SUBPŒNA AND MARSHAL'S RETURN—Filed Nov. 12, 1930

THE UNITED STATES OF AMERICA, *ss:*

The President of the United States to the State of Colorado, Greeting:

[Seal.]

For certain causes offered before the Supreme Court of the United States, having jurisdiction in Equity, you are hereby commanded that, laying all other matters aside and notwithstanding any excuse, you be and appear before the said Supreme Court, holding jurisdiction in Equity, on Monday, January 5, 1931, at the City of Washington, in the District of Columbia, being the Seat of the National Government of the United States, to answer unto a bill of complaint of the State of Wyoming exhibited against you.

Hereof you are not to fail at your peril.

Witness the Honorable Charles E. Hughes, Chief Justice of the United States, at the City of Washington, on the 14th day of October, A. D. 1930.

Charles Elmore Cropley, Clerk of the Supreme Court of the United States.

[fols. 36 & 37] Service of the foregoing Subpœna and a certified copy of the Bill of Complaint therein mentioned are this 8th day of Nov., 1930, accepted and acknowledged.

Wm. H. Adams, Governor of the State of Colorado.

Service of the foregoing Subpoena and a certified copy of the Bill of Complaint therein mentioned are this 8th day of November, 1930, accepted and acknowledged.

John S. Underwood, Attorney-General of the State of Colorado.

Came to my hand the 14th day of October, 1930, and executed through acceptance of service in writing by Wm. H. Adams, Governor of the State of Colorado, and John S. Underwood, Attorney-General of the State of Colorado, on the 8th day of November, 1930.

Witness my hand this 12th day of November, 1930, at the City of Washington.

Frank K. Green, Marshal, Supreme Court, U. S.

[File endorsement omitted.]

[fols. 38 & 39] SUPREME COURT OF THE UNITED STATES

[Title omitted]

MOTION FOR EXTENSION OF RETURN DAY—Filed Nov. 24, 1930

Comes now the State of Colorado, Defendant above named, by its undersigned Solicitors, and respectfully moves this Honorable Court to enter its Order herein extending the return day in the above entitled cause to and until Monday, March 2, 1931, and in support of this Motion files herewith the attached Stipulation.

Respectfully submitted, John S. Underwood, Attorney General of the State of Colorado; Charles Roach, Deputy Attorney General, Solicitors for Defendant.

[File endorsement omitted.]

[fols. 40 & 41] SUPREME COURT OF THE UNITED STATES

[Title omitted]

STIPULATION RE EXTENSION OF RETURN DAY—Filed Nov. 24, 1930

It is hereby stipulated and agreed by and between the undersigned attorneys and solicitors for the parties above named that the return day in the above entitled cause may be extended to and until Monday, March 2, 1931.

Dated and signed at Washington, D. C., this 21st day of November, 1930.

William O. Wilson, Attorney General of the State of Wyoming, Solicitor for Complainant; John S. Underwood, Attorney General of the State of Colorado; Charles Roach, Deputy Attorney General, Solicitors for Defendant.

[File endorsement omitted.]

[fols. 42 & 43] SUPREME COURT OF THE UNITED STATES

[Title omitted]

ORDER GRANTING MOTION FOR POSTPONEMENT OF RETURN DAY —Filed Nov. 25, 1930

On consideration of the motion and stipulation to postpone the return day for filing answer of the defendant to March 2, 1931,

It is now here ordered by the Court that the said motion be, and the same is hereby, granted.

[File endorsement omitted.]

[fol. 44] [File endorsement omitted]

IN SUPREME COURT OF THE UNITED STATES

[Title omitted]

MOTION TO APPROVE STIPULATION TO EXTEND RETURN DAY— Filed Feb. 27, 1931

Comes now the defendant, the State of Colorado, and respectfully prays:

That this Court approve the stipulation hereunto attached and made a part of this motion that the return day [fol. 45] in the above entitled cause may be extended to and until Monday, April 6, 1931.

Clarence L. Ireland, Attorney General of the State of Colorado; Charles Roach, Deputy Attorney General; Fred A. Harrison, Assistant Aoorney General, Solicitors for the Defendant.

[fol. 46] IN SUPREME COURT OF THE UNITED STATES

[Title omitted]

STIPULATION RE EXTENSION OF RETURN DAY—Filed Feb. 27, 1931

It is hereby stipulated and agreed by and between the undersigned attorneys and solicitors for the parties above

named that the return day in the above entitled cause may be extended to and until Monday, April 6, 1931.

[fol. 47] Dated and signed at Denver, Colorado, this 20th day of February, A. D. 1931.

James A. Greenwood, Attorney General of the State of Wyoming, Solicitor for Complainant; Clarence L. Ireland, Attorney General of the State of Colorado; Charles Roach, Deputy Attorney General; Fred A. Harrison, Assistant Attorney General, Solicitors for the Defendant.

[fols. 48 & 49] SUPREME COURT OF THE UNITED STATES

[Title omitted.]

ORDER GRANTING MOTION FOR EXTENSION OF RETURN DAY—
Filed March 2, 1931.

On consideration of the motion to extend the return day in this cause to April 6 next,

It is now here ordered by the Court that the said motion be, and the same is hereby, granted.

[File endorsement omitted.]

[fol. 50] [File endorsement omitted.]

[fol. 51] IN SUPREME COURT OF THE UNITED STATES

[Title omitted]

NOTICE OF MOTION TO DISMISS BILL OF COMPLAINT—
Filed April 6, 1931.

To the State of Wyoming, the Complainant herein, and the Honorable James A. Greenwood, Attorney General of said State and Solicitor for said Complainant:

You will please take notice that at the incoming of the Supreme Court of the United States at the hour of 12:00 o'clock M. in the Capitol Building in the City of Washington, District of Columbia, on Monday, April 6, 1931, or as soon thereafter as Solicitors can be heard, the above named

defendant will appear by its solicitors, ask leave to file a motion to dismiss the complaint; a copy of which Motion to Dismiss, together with a copy of the Brief in support [fol. 52] thereof is herewith served upon you. When and where you may be present if you so desire.

Clarence L. Ireland, Attorney General of the State of Colorado; Charles Roach, Deputy Attorney General; Fred A. Harrison, Assistant Attorney General of the State of Colorado, Attorneys for Defendant.

STATE OF WYOMING,
County of Laramie, *ss.:*

Service of the above Notice by delivery to me of a copy thereof, with a copy of the aforesaid Motion to Dismiss and Brief in support, is hereby acknowledged this — day of April, 1931.

James A. Greenwood, Attorney General of the State of Wyoming and Solicitor for Complainant.

[fol. 53] IN SUPREME COURT OF THE UNITED STATES

[Title omitted]

MOTION TO DISMISS BILL OF COMPLAINT—Filed April 6, 1931.

Comes now the State of Colorado by its undersigned attorneys and respectfully moves that the Court do now dismiss the pending bill of Complaint and each count thereof for want of equity apparent on the face of said bill, and for that the said bill does not state facts warranting the granting of the relief therein sought, or any relief, for the following reasons:

I

That this Court has no jurisdiction of either the parties to or the subject matter of this suit, because it appears on the face of said bill of complaint that the matters set forth therein do not constitute, within the meaning of the constitution of the United States, any controversy between the State of Wyoming and the State of Colorado.

II.

[fol. 54] That although the present bill purports to be supplemental to the bill filed in this Court in case No. 3, Original, State of Wyoming v. State of Colorado, and to have as its object the enforcement of the final decree entered by this Court in said suit, it fails sufficiently or at all to disclose any reason why any further decree is necessary to enforce said former decree, since the allegations of the present bill fail to show with certainty any violation of the provisions of said decree, and the allegations as to the supposed excessive diversions in the year 1926, through the Laramie-Poudre tunnel, are ambiguous and insufficient, and because if such alleged excessive diversions were made then the State of Wyoming has been and is guilty of laches in the premises.

III.

That the bill of complaint fails to show damage suffered by complainant or by its citizens with respect to any diversions alleged in said bill of complaint to have been unlawfully or excessively made.

IV.

That the allegations in Paragraphs 8 and 10 of the bill of complaint in support of the prayer for the installation by complainant of gauging devices and instruments in Colorado do not show that there is any uncertainty or difficulty in the ascertainment of the quantity of water diverted or carried through and by means of the Laramie-Poudre appropriation and tunnel, but said allegations have reference to other diversions not adjudicated or determined in and by the final decree of this Court in said former suit.

V.

That although the bill of complaint purports to be a supplemental bill for the enforcement of the former decree of this Court, in the case of State of Wyoming v. State of Colorado, it seeks greatly to extend the scope and effect of the decree entered in said case, to the end of undertaking [fol. 55] a complete adjudication of the rights to the use of water from the Laramie River, under an asserted claim that as against the rights of water users in the State of

Colorado, the priority of right of Wyoming appropriators as a class has been finally determined to be 272,500 acre-feet of water per annum, which asserted claim is without merit as does appear from the inspection of the record, opinions and decisions of this Court found in 259 U. S. 419 and 259 U. S. 496.

VI.

That said bill invites a construction of the former decree and seeks thereunder to extend the scope thereof to the adjudication of rights not therein litigated or determined, whereas said decree is not susceptible of such construction and no facts are alleged in support of the claimed interpretation of said decree, and such construction is inhibited by the 5th Amendment to the Constitution of the United States.

VII

That the bill is multifarious in this, to-wit, that thereby the State of Wyoming seeks (1) a supplemental decree to enforce and carry into effect the decree heretofore render-d b ythis Court in said case No. 3, Original; (2) the claims of the State of Wyoming in its sovereign capacity and as representative of the separate and several claims of numerous undisclosed Wyoming appropriators of water against the separate and several claims of the numerous undisclosed Colorado appropriators of water; (3) to obtain relief with respect to alleged excessive diversions through and by means of the Laramie-Poudre diversion and tunnel in the year 1926; and (4) to obtain ancillary relief with respect to the installation, maintenance and inspection of certain gauging devices for measurement of water diverted and carried by means of all trans-mountain ditches and reservoirs.

VIII

That it appears from the face of said bill that the acts complained of are not done by the State of Colorado nor under its authority, but by certain private corporations and [fol. 56] individuals with respect to whom relief is sought against the State of Colorado, and no decree which might be herein rendered would be efficacious to affect the vested rights of such corporations and individuals.

IX

That said bill of complaint is in other respects uncertain and insufficient and does not state facts sufficient to entitle the said State of Wyoming to the equitable relief prayed for.

Clarence L. Ireland, Attorney General of the State of Colorado; Charles Roach, Deputy Attorney General; Fred A. Harrison, Assistant Attorney General of the State of Colorado, Attorneys for Defendant State of Colorado; C. D. Todd, William R. Kelly, Paul W. Lee, George H. Shaw, Donald C. McCreey, William A. Bryans, III, Lawrence R. Temple, of Counsel.

We hereby certify that we are attorneys and of counsel for the defendant above named and that in our opinion the foregoing motion to dismiss the bill of complaint of said State of Wyoming is well founded and properly to be filed in the above cause.

Clarence L. Ireland, Fred A. Harrison, Paul W. Lee, Attorneys and of Counsel for Defendant State of Colorado.

[fol. 57] UNITED STATES OF AMERICA,
District of Colorado, ss.

Clarence L. Ireland, being first duly sworn, deposes and says that he is Attorney General of the State of Colorado, the defendant named in the foregoing Motion to Dismiss, and is authorized to verify the same on behalf of said defendant, and the foregoing Motion to Dismiss is not interposed to delay the cause or any proceeding therein.

Clarence L. Ireland.

Subscribed and sworn to before me this 31st day of March, A. D. 1931.

My commission will expire August 7, 1934.

Elizabeth D. Patten,
Notary Public.

(Seal.)

[fols. 58 & 59] SUPREME COURT OF THE UNITED STATES

[Title omitted]

STIPULATION TO CONTINUE HEARING ON MOTION TO DISMISS—Filed May 11, 1931

It is hereby stipulated and agreed by and between the undersigned attorneys and solicitors for the parties above named that the motion to dismiss heretofore filed by the defendant may be continued for hearing until the October Term, 1931.

Dated and signed at Denver, Colorado, this 8th day of May, A. D. 1931.

James A. Greenwood, Attorney General of the State of Wyoming, Solicitor for Complainant; Clarence L. Ireland, Attorney General of the State of Colorado; Charles Roach, Deputy Attorney General; Fred A. Harrison, Assistant Attorney General, Solicitors for the Defendant.

[File endorsement omitted.]

[fol. 60] [File endorsement omitted.]

[fol. 61] IN SUPREME COURT OF THE UNITED STATES

[Title omitted]

NOTICE OF APPLICATION TO SET CASE FOR HEARING ON MOTION TO DISMISS—Filed April 12, 1931

To the State of Colorado, the Defendant herein, and the Honorable Clarence L. Ireland, Attorney General of said State and Solicitor for said Defendant:

You will please take notice that at the incoming of the Supreme Court of the United States at the hour of 12:00 o'clock M., in the Capitol Building in the City of Washington, District of Columbia, on Monday, October 12th, 1931, or as soon thereafter as Solicitors can be heard, the above named Complainant will appear by its solicitors and present

[fol. 62] to said Court an application to have set for hearing, the motion to dismiss bill of complainant, heretofore filed herein, a copy of which application is presented herewith; When and Where you may be present if you so desire.

James A. Greenwood, Attorney General of the State of Wyoming; Richard J. Jackson, Deputy Attorney General of the State of Wyoming; Philip S. Garbutt, Assistant Attorney General of the State of Wyoming; George W. Ferguson, Assistant Attorney General of the State of Wyoming.

THE STATE OF COLORADO,
City and County of Denver, ss.

Service of the above Notice by delivery to me of a copy thereof, with a copy of the aforesaid Application, is hereby acknowledged this — day of October, 1931.

Clarence L. Ireland, Attorney General of the State of Colorado and Solicitor for Defendant.

[fol. 63] IN SUPREME COURT OF THE UNITED STATES

[Title omitted]

APPLICATION TO SET CASE FOR HEARING ON MOTION TO DISMISS—Filed Oct. 12, 1931

Comes now the Complainant in said cause, by James A. Greenwood, Attorney General of the State of Wyoming, and Solicitor and of counsel for the Complainant, and prays the Court to set down for argument, at some convenient date, the motion to dismiss bill of complaint, heretofore filed herein.

James A. Greenwood, Attorney General of the State of Wyoming and Solicitor for Complainant.

[fols. 64 & 65] SUPREME COURT OF THE UNITED STATES

[Title omitted]

ORDER SETTING CASE FOR HEARING ON MOTION TO DISMISS—Filed October 19, 1931

On consideration of the motion to set this case for hearing on the motion to dismiss the bill of complaint,

It is ordered by the Court that the said motion be, and the same is hereby, granted, and the case is assigned for Monday, November 30th next.

[File endorsement omitted.]

[fols. 66 & 67] SUPREME COURT OF THE UNITED STATES

[Title omitted]

MINUTE ENTRY OF ARGUMENT ON MOTION TO DISMISS—Dec. 3, 1931

This case was argued on the motion to dismiss the bill of complaint by Mr. Paul W. Lee for the defendant in support of the motion, and by Mr. James A. Greenwood for the complainant in opposition thereto.

[fols. 68 & 69] SUPREME COURT OF THE UNITED STATES

[Title omitted]

ORDER OVERRULING MOTION TO DISMISS, ETC.—Filed May 31, 1932

This cause came on to be heard on the motion to dismiss the bill of complaint herein, and was argued by counsel.

On consideration whereof, it is ordered by this Court that the motion to dismiss be, and the same is hereby, overruled, with leave to Wyoming to amend her bill within 30 days by making some of its allegations more definite and certain, if she be so advised, and permitting Colorado to answer the bill or amended bill, as the case may be, on or before the 1st day of September, next.

[File endorsement omitted.]

[fol. 70] [File endorsement omitted.]

[fol. 71] IN SUPREME COURT OF THE UNITED STATES

[Title omitted]

AMENDED ORIGINAL BILL OF COMPLAINT IN EQUITY—Filed June 30, 1932

To the Honorable, the Chief Justice and Associate Justices of the Supreme Court of the United States:

The State of Wyoming, by William O. Wilson, Attorney General of the State, under the direction of the Honorable Frank C. Emerson, Governor of the State, and in compliance with the request of the Honorable John A. Whiting, State Engineer of the State, and its Commissioner charged with authority in relation to interstate streams, by leave of this Honorable Court first had and obtained, brings this, its original bill of complaint, in its own behalf and that of its officials, agents, servants, and other citizens, residents and corporations, against the State of Colorado in its own behalf and that of its officials, agents, servants, representatives and other citizens, residents and corporations; [fol. 72] and respectfully sets forth and alleges, as its first cause of action, and permission having been granted by the Honorable Supreme Court of the United States so to do, complainant now, through its Attorney General, James A. Greenwood, files this, its amended bill of complaint:

First

That your complainant is one of the states of the United States entitled to enjoy all the privileges, rights and powers, and with all the duties, including the duty of protecting the rights, interests and property of its citizens and residents possessed or devolved upon each and all of said states of the United States of America.

Second

That the State of Colorado is likewise one of the states constituting the United States of America entitled to enjoy all the privileges, rights and powers, and with all the duties, including the duty of protecting the rights, interests and property of its citizens and residents possessed

and devolving upon each and all of said states of the United States of America.

Third

That on May twenty-ninth, A. D. 1911, an original suit in equity was instituted in this Honorable Court, by the above named complainant, the State of Wyoming, against the State of Colorado and the Greeley-Poudre Irrigation District and the Laramie-Poudre Reservoirs & Irrigation Company, to prevent a proposed diversion in Colorado of part of the waters of the Laramie River, an interstate stream; the opinion in said case rendered June 5, 1922, appearing in Vol. 259, U. S. Reports, page 419; 66 Law Edition, page 999; and the modified decree therein entered Oct. 9, 1922, [fol. 73] appearing in 260 U. S. Reports, page 1; 66 Law Edition, page 1026.

Fourth

That it was found and determined in said case that the said Laramie is an unnavigable river which has its source in the mountains of northern Colorado, flows northerly twenty-seven miles in that state, crosses into Wyoming, and there flows northerly and northeasterly one hundred and fifty miles to the North Platte river, of which it is a tributary; and that both Colorado and Wyoming are in the arid region where flowing waters are, and long have been, commonly diverted from their natural channels and used in irrigating the soil and making it productive; and that for many years some of the waters of the Laramie river have been subjected to such diversion and use, part in Colorado and part in Wyoming.

Fifth

That this Honorable Court further found the entire water supply available for the proposed Colorado appropriation and the Wyoming appropriations down to and including the diversion for the Wheatland district is 288,000 acre-feet per annum; and that there are some existing Colorado appropriations having priorities entitling them to precedence over many of the Wyoming appropriations; that these recognized Colorado appropriations are 18,000 acre-feet to be diverted by what is known as the Skyline ditch

diversion, and 4,250 acre-feet for the irrigation of that number of acres of native-hay meadows in the Laramie valley in Colorado; and that these recognized Colorado appropriations, aggregating 22,250 acre-feet, were not to be deducted from the 288,000 acre-feet, that being the available annual supply after they are satisfied; and that thus the [fol. 74] total available annual supply of water for irrigation, in Wyoming and Colorado out of the waters of the Laramie River and its tributaries, was said 288,000 acre-feet of water, and said 22,250 acre-feet of water; or a total available annual supply of water for irrigation of lands in Colorado and Wyoming from the Laramie River and its tributaries in the total sum of 310,250 acre-feet of water; in addition to the waters of Sand Creek, which rises in Colorado and extends into the Laramie plains in Wyoming, and discharges into Hutton Lake, a few miles from the Laramie River, and the waters of which creek, for reasons stated in the opinion, were not regarded by this Honorable Court as a factor in the controversy;

Sixth

That this Honorable Court further found and determined that the evidence showed that the Wyoming appropriations having priorities senior to the one in Colorado, and which are dependent on the available water supply before named, cover 181,500 acres of land, and that the amount of water appropriated and reasonably required for the irrigation of said lands is 272,500 acre-feet; that a much larger amount was claimed, but the findings of the court restricted the amount to what the evidence showed was reasonably required; and that as the available supply is 288,000 acre-feet, and the amount covered by senior appropriations in Wyoming is 272,500 acre-feet, there remains 15,500 acre-feet which are subject to the junior appropriation in Colorado, to-wit; the Laramie-Poudre Tunnel appropriation.

Seventh

That in and by its final decree, this Honorable Court then considered, ordered and decreed, that the defendants, their officers, agents and servants be, and they were thereby, [fol. 75] severally enjoined from diverting or taking from the Laramie River and its tributaries in the State of Colo-

rado, more than fifteen thousand five hundred (15,500) acre-feet of water per annum, in virtue of or through what is designated in the pleadings and evidence as the Laramie-Poudre tunnel appropriation in that state; and provided therein that said decree should not prejudice the right of the State of Colorado, or of anyone recognized by her as duly entitled thereto, to continue to exercise the right existing and thereby recognized to divert and take from such stream and its tributaries in that state the following:

(1) Eighteen thousand (18,000) acre-feet of water per annum in virtue of and through said Skyline ditch appropriation in that state;

(2) Four thousand two hundred and fifty (4,250) acre-feet of water per annum in virtue of and through the meadow-land appropriations in that state;

(3) The relatively small amount of water appropriated from the headwaters of Deadman Creek, a Colorado tributary of the Laramie River, prior to the year 1902, by and through what is designated in the evidence as the Wilson Supply Ditch; and

(4) That the decree should not prejudice or affect the right of the State of Colorado or the State of Wyoming, or anyone recognized by either state as duly entitled thereto, to continue to exercise the right to divert and use water from Sand Creek, sometimes spoken of as a tributary of the Laramie River, by virtue of any existing and lawful appropriation of the waters of such creek.

Eighth

That plaintiff has been reliably informed, and therefore on information and belief alleges the fact to be that the gauging and measuring devices installed by the defendant [fol. 76] do not accurately gauge and measure the full amount of water diverted by means of and through the designated lawful diversions as defined in the said decree of this Honorable Court.

Ninth

That the State of Colorado, as your complainant is informed and believes, and therefore alleges the fact to be, has permitted water to be diverted from the Laramie River

and its tributaries by means of and through the Laramie-Poudre tunnel diversion in excess of 15,500 acre-feet per annum; that during portions of the year 1926, there were, as shown by the official records of Colorado, diversions through said tunnel of 13,572 acre-feet, and unreported diversions through said tunnel in the amuont of over 3,000 acre-feet, making a total diversion for the year 1926 in excess of the amount of 15,500 acre-feet as provided in said decree; that such measurements, on which complainant has relied, are from the records certified by the State Engineer of Colorado; based on records of the water commissioner of the district, who compiled the original record of measurements; that, however, the records of the division engineer, certified to by him, show the diversion of 5,644 acre-feet, instead of 13,572 acre-feet, of water;

Tenth

That through, by and under said decree, the State of Wyoming was found by this Honorable Court to be entitled to an amount of water for the purpose of irrigating lands in said state far in excess of the amount of water to which the State of Colorado was entitled, for the purpose of irrigating lands in the State of Colorado; and therefore has a vital interest in the appropriation, diversion and measurement of the waters of the Laramie river and its tributaries [fol. 77] in Colorado, and should therefore be permitted to install its own standard gauging devices and make its own measurements of diversion of water from said Laramie River and its tributaries in Colorado; yet Colorado, though requested in writing by Wyoming for such permission, denied such request; and that, therefore, all allegations herein as to the measurements of water and the quantities are necessarily dependent on the gauging devices and measurements and records thereof as kept by Colorado and its officials.

Eleventh

That the State of Colorado has, in the manner and by the means hereinafter alleged, violated and disregarded said decree and the terms thereof; and the injunction therein contained against the excessive or otherwise unlawful diversions, of water, as hereinafter described;

Twelfth

That during the following years there was diverted in the State of Colorado by its officials, agents, representatives, and other citizens and residents, by and with the knowledge, consent, permission, and cooperation of the said State of Colorado, and its officials, agents, representatives and servants, from the Laramie River and its tributaries in Colorado, to the Cache La Poudre River, for the irrigation of lands in Colorado, the following amounts of water in excess of the 18,000 acre-feet of water, being the amount authorized so to be diverted under said decree of this Honorable Court by said Skyline Ditch, to-wit:

(1) During the year 1927, 22,150 acre-feet of water, or 4,150 acre-feet in excess of the annual amount of water authorized by said decree thus to be diverted;

[fol. 78] (2) During the year 1928, 19,397 acre-feet of water, or 1,397 acre-feet in excess of the annual amount of water authorized by said decree thus to be diverted;

(3) During the year 1929, 24,363 acre-feet of water, or 6,363 acre-feet of water in excess of the annual amount authorized by said decree thus to be diverted.

Thirteenth

That during the following years there was diverted in the State of Colorado by its officials, agents, representatives, and other citizens and residents, and corporations, by and with the knowledge, consent and cooperation of the said State of Colorado, and its officials, agents, representatives and servants, from the Laramie River and its tributaries in Colorado, the following amounts of water in excess of the amount authorized under said decree to be diverted for the purpose of irrigating 4,250 acres of meadow land in the State of Colorado:

(1) During the year 1926, 61,767 acre-feet of water, or 57,517 acre-feet of water in excess of the annual amount authorized by said decree thus diverted, which was used to irrigate 61,162 acres of natural hay meadows.

(2) During the year 1927, 54,152 acre-feet of water, or 49,902 acre-feet of water in excess of the annual amount authorized by said decree thus diverted, which was used to irrigate 5,517 acres of natural hay meadows.

(3) During the year 1928, 56,275 acre-feet of water, or 52,025 acre-feet of water in excess of the annual amount authorized by said decree thus diverted, which was used to irrigate 6,767 acres of natural hay meadows.

(4) During the year 1929, 58,772 acre-feet of water, or 54,522 acre-feet of water in excess of the annual amount authorized by said decree thus diverted, which was used to irrigate 6,792 acres of natural hay meadows.

[fol. 79] Fourteenth

That in addition to the excessive and unlawful diversions in violation of said decree of this Honorable Court, as above alleged, the State of Colorado, by its officials, agents and servants, and by and with the knowledge, consent and cooperation of the said State of Colorado, and its officials, agents and servants, has permitted the following unlawful and/or excessive trans-mountain diversions of water to be made from the Laramie River and its tributaries in Colorado through the Bob Creek ditch; Lost Lake Reservoir System; Columbine ditch; the Wilson Supply ditch, sometimes referred to as the Deadman Feeder Ditch; the Divide ditch; and the Deadman Extension Ditch; to the watershed of the Cache La Poudre River for the irrigation of lands in Colorado, contrary to and in violation and disregard of the terms of said decree of this Honorable Court, as follows:

1. The Bob Creek ditch as constructed, heads north fifty-eight degrees fifty-six minutes west three thousand five (3005) feet from the quarter corner between sections three and ten, in township nine north of range seventy-five west of the sixth principal meridian; that from this point it has a northeasterly course to near the center of section three; thence in a southeasterly course through the southeast quarter of section three and the southwest quarter of the southwest quarter of section two; thence in a southeasterly course through the north one-half of section eleven in said township and range, emptying into Roaring Fork, a Colorado tributary of the Cache La Poudre River, in the southwest quarter of the northeast quarter of section eleven, in said township and range; that the length of the ditch is two and one-half miles, that the cross section shows a bottom width of four feet capable of carrying two feet depth of water, eight feet wide at two-foot water level; that it has a fall of five feet

[fol. 80] per mile, with an approximate carrying capacity of thirty-six second feet of water;

2. That a small ditch eight hundred (800) feet long has been constructed across a marsh to divert water into Bob Creek Ditch about the southeast quarter of the northwest quarter of section eleven, township nine north of said range; that the sources of supply of said Bob Creek ditch are several tributaries of Nunn Creek, and that the water then flows into Roaring Fork Creek, a tributary of the Cache La Poudre River; and thus the water is thereby unlawfully diverted from the Laramie River and its tributaries into the Cache La Poudre watershed for the irrigation of lands in Colorado, contrary to and in violation and disregard of the terms of the said decree of this Honorable Court; and that such unlawful diversions of water from the watershed of the Laramie River into the watershed of the Cache La Poudre River by means of and through the said Bob Creek Ditch have been in the following quantities, to-wit:

(1) In the year 1922, 512 acre-feet;
(2) In the year 1923, 1174 acre-feet;
(3) In the year 1924, 0 acre-feet;
(4) In the year 1925, 745 acre-feet;
(5) In the year 1926, 0 acre-feet;
(6) In the year 1927, 1044 acre-feet;
(7) In the year 1928, 535 acre-feet;
(8) In the year 1929, 1153 acre-feet;

and that in addition to said quantities of water so unlawfully diverted as hereinabove alleged, the defendant State of Colorado, through its officials, agents and servants, and by and with the knowledge, consent and cooperation of said State of Colorado and its officials, agents and servants, was, on the 17th day of June, A. D. 1932, diverting and permitting to be diverted from the watershed of the Laramie River into [fol. 81] the watershed of the Cache La Poudre River through said Bob Creek Ditch, water at the rate of 6.06 cubic feet per second;

That there is also an unfinished extension ditch to said Bob Creek Ditch;

3. The Columbine Ditch is located in sections twenty-six and thirty-five, township ten north of said range, in the State of Colorado; that the length of the ditch is one and three-

tenths (1.3) miles; that the ditch has an average cross section of four-foot bottom, six feet at water level, with a depth of two feet, and a slope of five feet per mile; that its approximate carrying capacity is thirty second feet; that its source of supply is Columbine Creek or a branch of it, being tributaries of the Laramie River; that the greater part of the water being carried by it is the early run-off; that the water from the said Columbine Ditch is discharged into a branch of the North Poudre River, and thence into the Poudre River watershed, for the irrigation of lands in Colorado, contrary to and in violation and disregard of the terms of the said decree of this Honorable Court; that such unlawful diversions of water from the watershed of the Laramie River into the Cache La Poudre River by means of and through the Columbine Ditch, have been in the following quantities, to-wit:

(1) In the year 1922, 181 acre-feet;
(2) In the year 1923, 332 acre-feet;
(3) In the year 1924, 0 acre-feet;
(4) In the year 1925, 259 acre-feet;
(5) In the year 1926, 0 acre-feet;
(6) In the year 1927, 376 acre-feet;
(7) In the year 1928, 373 acre-feet;
(8) In the year 1929, 590 acre-feet;

and that in addition to said quantities of water so unlawfully diverted as hereinabove alleged, the defendant State [fol. 82] of Colorado, through its officials, agents and servants, and by and with the knowledge, consent and cooperation of said State of Colorado and its officials, agents and servants, was, on the 17th day of June, A. D. 1932, diverting and permitting to be diverted from the watershed of the Laramie River into the watershed of the Cache La Poudre River through said Columbine Ditch, water at the rate of 4.02 cubic feet per second.

4. The Lost Lake system is composed of five lakes: Lost Lake, Laramie Lake, Lily Lake, and the Twin Lakes; but that three of such lakes only are used for storing water, to-wit: Lost Lake, Laramie Lake and Lily Lake; their capacity being 806 acre-feet of water:

(1) Lost Lake, which is located in the northeast quarter of section six, in township seven north of said range, and in

the southeast quarter of section thirty-one in township eight north of said range;

(2) Laramie Lake, which is located in the northwest quarter of the southwest quarter, and the southwest quarter of the northwest quarter of section thirty-two, in township eight north of said range; that a ditch has been constructed in order that the water from the Laramie Lake will flow into Lost Lake, and thence into Chambers Lake situated at the head of the Cache La Poudre River, into which river it flows;

(3) Lily Lake, which is located near the center of section twenty-nine, in township eight north of said range; that the water from Lily Lake flows down a natural channel to Laramie Lake;

(4) Twin Lakes, which are located in the northwest quarter of section twenty-nine, in township eight north of said range; that such lakes have no dike to hold water as the other three lakes of the Lost Lake system have; but a ditch has been constructed to drain these lakes which flows into [fol. 83] a natural channel into Laramie Lake;

(5) That the sources of supply of said Lost Lake system are unnamed tributaries of the Laramie River; and that the water flows therefrom into said Chambers Lake; that all the water stored in these lakes would flow into the Laramie River if the dams and ditches did not cause the water to flow into Chambers Lake, thence into the Cache La Poudre River; and thus the water is thereby unlawfully diverted from the Laramie River and its tributaries into the Cache La Poudre watershed for the irrigation of lands in Colorado, contrary to and in violation and disregard of the terms of the said decree of this Honorable Court; and that the only record of the water diverted by the officials of Colorado shows that in the year 1926, 448 acre-feet were thus unlawfully diverted;

(6) That the State of Colorado, by its officials, agents, and servants, and by and with the knowledge, consent and cooperation of said State of Colorado and its officials, agents and servants, was, on the 17th day of June, A. D. 1932, through and by means of Lost Lake, Laramie Lake and Lily Lake, being three of the five lakes constituting the Lost Lake System, unlawfully storing in said lakes, the

waters collected from the watershed of the Laramie River with the purpose and intent to divert said stored waters from said lakes into Chambers Lake Reservoir and thence into the Cache La Poudre River.

5. The Wilson Supply Ditch, sometimes referred to as the Deadman Feeder Ditch, has its headgate in the southeast quarter of section fifteen, township ten north of said range; and runs in a northwesterly course; is one and three-[fol. 84] tenths (1.3) miles long, with a five-foot fall per mile; has a cross section of eight-foot bottom, three feet depth of water, thirteen feet across at water level, carrying capacity of approximately one hundred and thirty second-feet; its main source of water is Deadman Creek or a tributary to it; and the water flows through this ditch into Sand Creek, and from Sand Creek is diverted by the Divide ditch into Sheep Creek, a tributary of the North Cache La Poudre River, which flows into the Cache La Poudre River, for the irrigation of lands in Colorado;

6. The Deadman Extension Ditch is an addition to the Wilson Supply Ditch, sometimes referred to as the Deadman Feeder Ditch, running to the south to intercept several small streams; that it extends from the Wilson Supply Ditch in the southwest quarter of section fourteen, in township ten north of said range, in a general southerly direction through the east half of section twenty-two and the west half of section twenty-three, diverting water from two small streams in the west half of said section twenty-three; and the ditch is extended a short distance beyond the point where the water is diverted in the southwest quarter of said section twenty-three.

7. That an examination of said Deadman Extension ditch in 1929 disclosed that a survey of the ditch had been made for an enlargement; the slope stakes being set for enlarging the ditch from a three-foot bottom to a six-foot bottom; that the point where the enlargement stakes were set was north thirteen degrees east six hundred feet from the southwest corner of section fourteen, in township ten north of said range; thence in a southwesterly course thirty-two hundred feet; thence in a southeasterly course about twenty-four hundred feet to a branch of Deadman Creek; passing

through the southwest quarter of the southwest quarter of section fourteen; thence through the southeast quarter of [fol. 85] the southeast quarter of section fifteen; thence through the northeast quarter of section twenty-two, ending in the southwest quarter of the northwest quarter of section twenty-three; all in said township ten north of said range;

8. That an enlargement based on such survey was made in the fall of 1929; and in 1930 it was disclosed that said ditch had been recently constructed to a six-foot bottom; that the ditch can, as reconstructed and enlarged, carry a two-foot depth of water with a two-foot freeboard; that the slope or fall per mile is approximately five feet; that the ditch is capable of carrying forty-eight second feet of water; that part of the ditch carrying water last year has not been enlarged this year.

Fifteenth

That in and by the decree of this Honorable Court, as heretofore alleged, it was provided that said decree should not prejudice the right of the State of Colorado, or of any one recognized by her as duly entitled thereto, to continue to exercise the right then existing and thereby recognized to divert and take from such stream (Laramie) and its tributaries the relatively small amount of water appropriated from the headwaters of Deadman Creek, a Colorado tributary of the Laramie River, prior to the year 1902, by and through what is designated in the evidence as the Wilson Supply Ditch; that prior to the year 1902, neither the defendant State of Colorado, nor anyone claiming under the laws of the State of Colorado, had an existing and lawful appropriation of water from the headwaters of Deadman Creek, a Colorado tributary of the Laramie River; and prior to the year 1902, neither the defendant State of Colorado, nor anyone claiming to be recognized by her as duly entitled thereto, diverted any water from said Deadman [fol. 86] Creek or any other recognized tributary of said Laramie River through said Wilson Supply Ditch; that there was not prior to the year 1902, and there is not now, an existing lawful appropriation of the waters of said Deadman Creek by and through said Wilson Supply Ditch into Sand Creek and thence into the Divide Ditch; that plaintiff,

because no records are available to plaintiff showing the exact quantities of water diverted in Colorado by and through the Wilson Supply Ditch into Sand Creek, therefore, on information and belief, alleges the fact to be that said Wilson Supply Ditch, as a means of so diverting water from said Deadman Creek, has, as hereinbefore alleged, been enlarged and the capacity thereof increased and that by means thereof, continuing and additional quantities of water have been diverted during the twenty-five years last past from said Deadman Creek and from the area of said Laramie River watershed affected by said Wilson Supply Ditch in addition to the waters of Deadman Creek, that the defendant was, on the 20th day of June, A. D. 1932, by and through its officers, agents and servants, and with the defendant's knowledge, consent and cooperation, diverting and permitting to be diverted by and through the Sand Creek System, (including the Wilson Supply and Divide Ditch) the entire flow of said waters (approximately 43.75 cubic feet per second) of said Sand Creek in Colorado above the point of diversion from said Sand Creek into the Divide Ditch, thence through Sheep Creek into the Cache La Poudre Valley, including approximately, 25.62 cubic feet of water per second from the Laramie River watershed, including said Deadman Creek, through and by means of said Wilson Supply Ditch, and thus preventing any of the waters of said Sand Creek continuing in said stream to flow into the State of Wyoming for the benefit of those lawfully entitled to the use thereof in Wyoming; and that the water so unlawfully diverted by [fol. 87] and through said Wilson Supply Ditch from the watershed of the Laramie River, constitutes a part of the 272,500 acre-feet which this Honorable Court found available for the irrigation of land within the State of Wyoming, and that said diversions by and through said Wilson Supply Ditch have contributed to the fact that Wyoming and its water users have been unable to obtain from said Laramie River, the amount of water, namely, 272,500 acre-feet, which this Honorable Court decreed was her equitable portion of said waters to be obtained in the manner as by said Court directed.

Sixteenth

That there are pending at this time in the district court of Larimer County, Colorado, applications filed July 12,

1926, on behalf of the Water Supply and Storage Company, as owner, of said Laramie Lake, Lost Lake and Lily Lake, referred to therein as reservoirs, for the purpose of having decreed to said owner, authority under the laws of Colorado, to divert and store water for irrigation purposes in said reservoirs; in the amount and capacity in the petitions filed therein set forth; the petitions alleging further that said Laramie reservoir has an area of forty-seven acres, and an estimated capacity of 14,817,744 cubic feet of water; that said Lost Lake reservoir has an area of twenty-six acres, and an estimated capacity of 12,541,030 cubic feet of water; that said Lily Lake reservoir has an area of fifty-nine and five-tenths acres, and an estimated capacity of 7,747,189 cubic feet of wter;

[fol. 88]

Seventeenth

That there is also pending in the said district court of Larimer County, Colorado, the application filed July 12, 1926 of the Mountain and Plains Irrigation Company, owner of the Bob Creek ditch, for the purpose of having decreed to it an adjudication of priority to waters to be diverted from the Laramie River Basin by means of said Bob Creek ditch diversion, sometimes known as Nunn Creek ditch; said petition alleging as follows: That said ditch begins in section three and ends in section two, in township nine north of said range; that it is eight thousand one hundred and thirty feet (8130) long, with a carrying capacity of one hundred cubic feet per second of time; that as a part of said Bob Creek ditch, a feeder ditch was constructed, located in said section two; and also that the Bob Creek Extension ditch across the channel of said Bob Creek, also sometimes known as Nunn Creek ditch, is completed to a distance of approximately six thousand feet, and has a carrying capacity of fifty cubic feet per second of time; and that said Bob Creek ditch and said Bob Creek Extension ditch are used for the irrigation of agricultural lands in the counties of Larimer and Weld in the State of Colorado, the number of acres not being alleged; and that said applications for said decrees are now pending before referees.

Eighteenth

That a corrected topographical map of the watershed of the Laramie river and its tributaries in Colorado, showing

the location of the diversions, described herein, is attached hereto, marked "Exhibit A" and hereby expressly made a part hereof;

[fol. 89] Nineteenth

That officials of the State of Wyoming, charged with the supervision of the waters of the state and of their appropriation, diversion and distribution, have conferred with like officials of the State of Colorado, and have protested orally against such excessive or otherwise unlawful diversions of water from the Laramie River and its tributaries in Colorado, for the irrigation of lands in Colorado, contrary to and in violation and disregard of said decree of this Honorable Court; but such officials of Colorado have denied that any such excessive or otherwise unlawful diversions existed; and that such officials in Wyoming further protested in writing to the said officials of Colorado against such excessive and otherwise unlawful diversions; and such officials of Colorado replied in writing that they were unable to find that Colorado or her citizens had violated the decree of this Honorable Court, and were at all times willing and anxious to abide by the terms thereof, and requested a conference of such officials, which was accordingly held on September 26th, A. D. 1930; and that at such conference the assertion on behalf of Wyoming of such excessive and otherwise unlawful diversions of water by and on behalf of Colorado, as herein alleged, was denied by and on benalf of Colorado; and that, therefore, your complainant is without relief from such excessive and otherwise unlawful diversions of water, except through and by the order, judgment and decree of this Honorable Court.

Twentieth

That furthermore, the State of Colorado, unless restrained by this Honorable Court, will, through its officials, agents, representatives, servants, or other citizens or residents, or its corporations, continue to increase the diversion [fol. 90] of water from the Laramie River and its tributaries for the irrigation of lands in Colorado; and unless restrained, will continue until the amount of water determined by the decree of this Honorable Court as being available to Wyoming for the water users in Wyoming, to-wit: 272,500 acre-feet, will be gradually reduced and finally con-

sumed, and Wyoming and its citizens, residents and corporations will be deprived of any protection under the said decree to the use of the waters to which it was determined by said decree to be entitled, and that annually since the entry of said decree, the amount of water available to the State of Wyoming for its water users has been less than said 272,500 acre-feet of water per annum; caused by reason of said excessive and otherwise unlawful diversions;

Twenty-First

Your complainant, the State of Wyoming, offers to do full and complete equity to the State of Colorado in respect to the administration, diversion and use of the waters of the Laramie River and its tributaries; but this complainant alleges that no other court than this Honorable Court, upon the general doctrines of law, or the constitution of the United States, or under the specific adpudication and decree and the governing principles set forth in the said case of Wyoming vs. Colorado, et al., has any authority or jurisdiction whatsoever to adjudicate upon the matters which were adjudicated in said decree in said case; and furthermore, that Colorado, and through it, its officials, agents, representatives, servants, and other citizens and residents, and its corporations, should be required by this Honorable Court to abide by the terms of said decree, and be prevented by this Honorable Court from any violation of the terms thereof.

[fol. 91] Twenty-second

Your complainant has no adequate remedy at law, nor any remedy at law, nor any remedy in any court whatsoever, except this Supreme Court of the United States, in respect to the matters and things herein set forth and alleged.

[fol. 92] Second Cause of Action

The State of Wyoming by William O. Wilson, Attorney General of the State, under the direction of the Honorable Frank C. Emerson, Governor of the State, and in compliance with the request of the Honorable John A. Whiting, State Engineer of the State and its Commissioner charged with authority in relation to interstate streams, by leave of this Honorable Court first had and obtained, brings this its

original bill of complaint, in its own behalf and that of its officials, agents, servants, and other citizens, residents and corporations, against the State of Colorado, in its own behalf, and that of its officials, agents, servants, representatives and other citizens, residents and corporations, and respectfully and fully sets forth and alleges as and for its second cause of action, and permission having been granted by the Honorable Supreme Court of the United States so to do, claimant now, through its Attorney General, James A. Greenwood, files this, its amended bill of complaint:

First

Complainant refers to all matters and things alleged and set forth in paragraphs numbered first to twenty-first, both inclusive, of this petition, and makes all of the said matters and things alleged in said paragraphs numbered first to twenty-first, both inclusive, of said first cause of action, a part of this its second cause of action, with the same effect and to all intents and purposes, as though herein specifically set forth and alleged.

[fol. 93] Second

That the State of Wyoming made request on March 8, 1928, in writing, of the State of Colorado for permission to install measuring devices in order to make an inventory of such waters in Colorado, jointly with Colorado and with the United States Geological Survey, such inventory to be made by Wyoming, at its own expense; but that this request was denied in writing on April 5, 1928, by the State of Colorado, and that by reason of such refusal, Wyoming, with a greater interest than Colorado in the said waters of the Laramie River watershed, by virtue of the said decree of this court, is compelled to rely on the measurements made by Colorado.

Third

That, therefore, the State of Wyoming should be permitted by means of the order of this Honorable Court, to install gauging devices in the State of Colorado, in the Laramie River and its tributaries and in any transmountain ditches, lakes and reservoirs by means of which water is being or may be diverted from said Laramie River and its tributaries in the State of Colorado to the Poudre River

basin; and to take any and all measurements therefrom for the purpose of ascertaining the amount of water being appropriated and diverted from said Laramie River and its tributaries, for the irrigation of lands in Colorado, or that such installation of gauges, and measuring of such waters should be carried on by the Federal Government, at the expense of the said states.

Fourth

Your complainant, the State of Wyoming, offers to do full and complete equity to the State of Colorado in respect to the matters and things in this cause of action alleged.

[fol. 94] Fifth

Your complainant has no adequate remedy at law, or any remedy at law, nor any remedy in any court whatsoever except this Supreme Court of the United States in respect to the matters and things herein set forth and alleged.

Wherefore the State of Wyoming prays as to its first and second causes of action herein that this Honorable Court summon the State of Colorado, as defendant to appear herein, present its answer, if any, and abide by the determination of this Court; and that this Honorable Court may exercise its sole jurisdiction over the determination of the use of the waters of the Laramie River and its tributaries, and protect and quiet the rights of the State of Wyoming, its officers, agents, representatives or other citizens and residents, and its corporations, under the adjudication and decree in said case of Wyoming vs. Colorado, et al.; and that the State of Wyoming be permitted to install standard gauging devices, and take any and all such requisite measurements of water, and make records thereof, as heretofore alleged: and that this Honorable Court direct the installation of necessary gauging devices for the recording of all waters diverted from the Laramie River under authority of the decrees of this Honorable Court; and that said gauging and measuring devices be supervised, maintained and operated under the direction, authority and control of the Federal Government; and that this Honorable Court prohibit any diversions of water from the Laramie River and its tributaries in excess of the quantities annually au-

thorized to be diverted under the terms of said decrees; and that all diversion works and structures heretofore constructed in the State of Colorado for the diversion or storage of water on the Laramie River watershed other than for the diversion of the recognized appropriations, be ordered abated and said means of diversion and storage be [fol. 95] ordered removed; that the said State of Colorado, and through it or otherwise, as the court may determine, its officers, agents, representatives or servants, or other persons or citizens and its corporations, be permanently enjoined from diverting any water from said Laramie River and its tributaries in Colorado, for the irrigation of lands in Colorado, in excess of the quantities of water allotted to Colorado in and by the terms of said decrees; or from further adjudication thereon in the Courts of Colorado; and that this Honorable Court give and grant such other full, further, or different relief as may be just and equitable.

The State of Wyoming, by James A. Greenwood, Attorney General of the State of Wyoming; Richard J. Jackson, Deputy Attorney General of the State of Wyoming; George W. Ferguson, Assistant Attorney General of the State of Wyoming; R. Dwight Wallace, Assistant Attorney General of the State of Wyoming, Solicitors for Complainant.

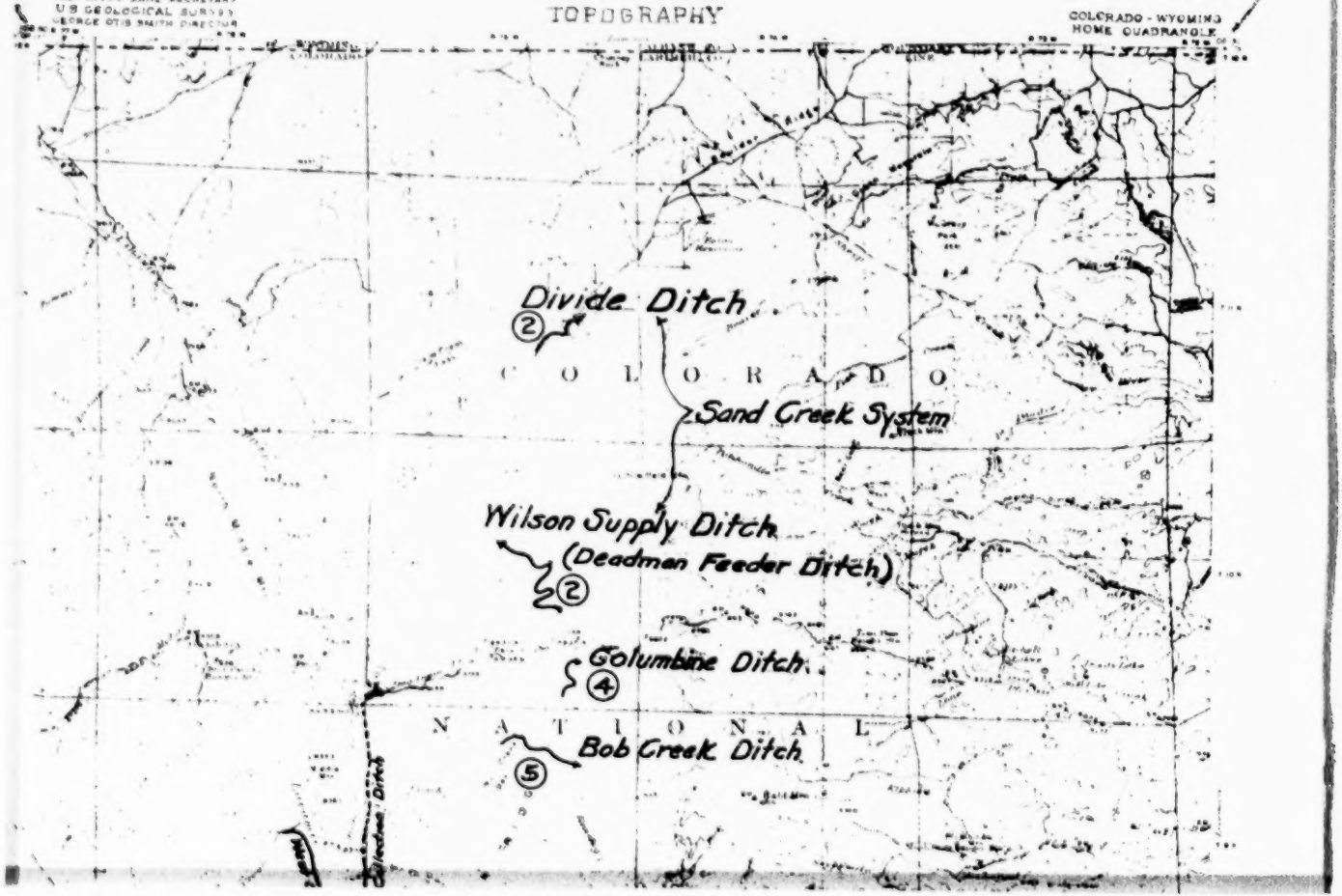
[fol. 96] *Duly sworn to by James A. Greenwood. Jurat omitted in printing.*

STATE OF COLORADO,
City and County of Denver, ss:

Service of a copy of the Amended Bill of Complaint in the case of State of Wyoming vs. State of Colorado, Original No. 15, is hereby acknowledged to have been received by me, this — day of ——, A. D. 1932.

Clarence L. Ireland, Attorney General of Colorado, and Solicitor for Defendant.

(Here follows photolithograph of map, Exhibit A, side folio 97.)


TOPOGRAPHY
COLORADO - WYOMING
HOME QUADRANGLE
Divide Ditch
2
C O L O R A D O
Sand Creek System
Wilson Supply Ditch
(Deadman Feeder Ditch)
2
Columbine Ditch
4
N A T I O N A L
Bob Creek Ditch
5

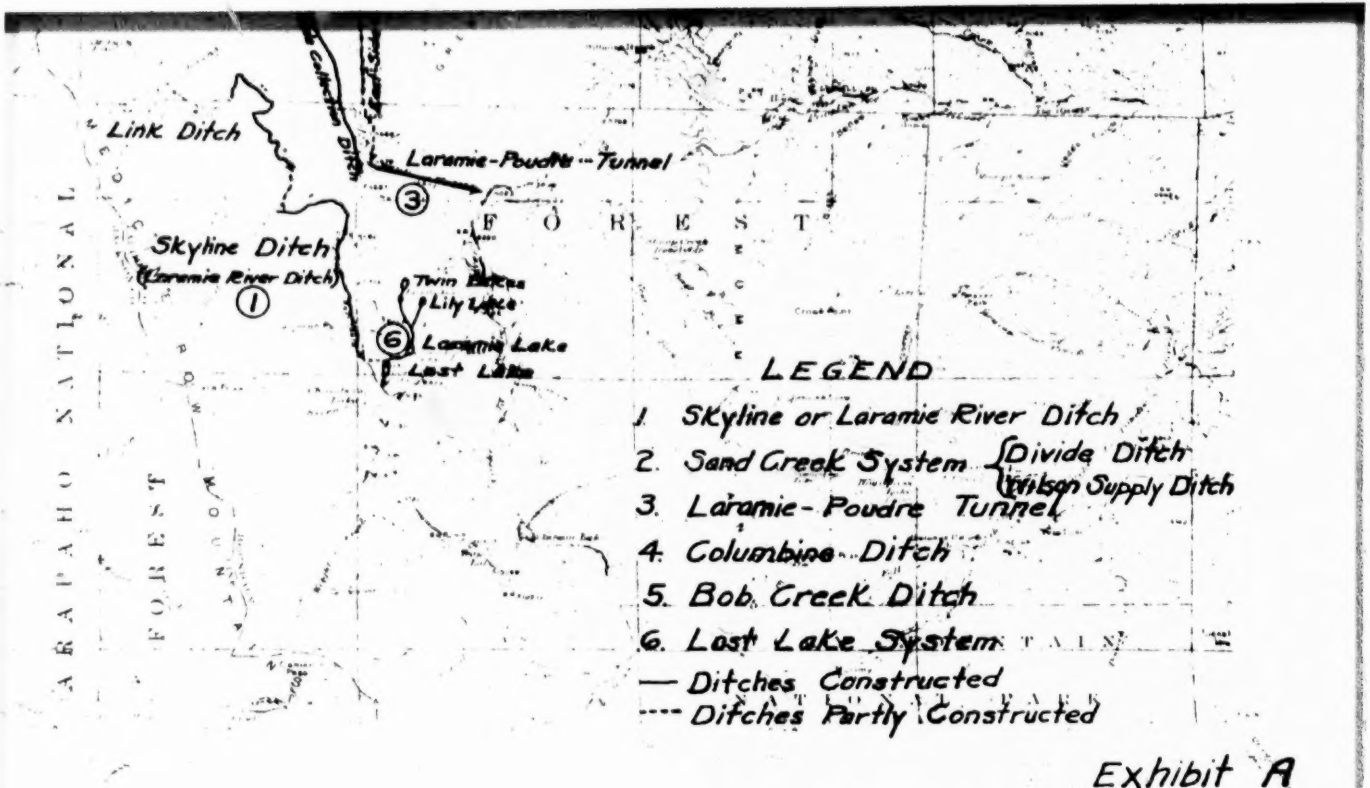

Link Ditch
Laramie-Poudre Tunnel
Skyline Ditch
(Laramie River Ditch)
Twin Lakes
Lily Lake
Lost Lake
ARAPAHO NATIONAL
FOREST
F O R E S T
LEGEND
1. Skyline or Laramie River Ditch
2. Sand Creek System {Divide Ditch / Wilson Supply Ditch
3. Laramie-Poudre Tunnel
4. Columbine Ditch
5. Bob Creek Ditch
6. Lost Lake System
— Ditches Constructed
---- Ditches Partly Constructed

Exhibit A

[fols. 98 & 99] SUPREME COURT OF THE UNITED STATES

[Title omitted]

STIPULATION TO EXTEND TIME WITHIN WHICH TO FILE ANSWER—Filed Aug. 24, 1932

Whereas, efforts are being made by the defendant through a conference with the complainant to bring about a mutually satisfactory adjustment of the controversies between the complainant and the defendant; and,

Whereas, the complainant and defendant have agreed to such conference in the near future to meet the convenience of the complainant.

It is hereby stipulated by and between counsel of record in the above entitled cause that the defendant may have an extension of time of fifteen days to and including September 15, 1932, in which to file its answer if an adjustment fails, provided such extension of time be agreeable to this Honorable Court.

Clarence L. Ireland, Attorney General; Geo. A. Crowder, Deputy Attorney General; E. J. Plunkett, Assistant Attorney General, Solicitors for Defendant; James A. Greenwood, Solicitor for Complainant.

[File endorsement omitted.]

[fol. 100] [File endorsement omitted]

[fol. 101] IN SUPREME COURT OF THE UNITED STATES

[Title omitted]

ANSWER OF THE STATE OF COLORADO TO THE AMENDED ORIGINAL BILL OF COMPLAINT—Filed Sept. 15, 1932

Comes now the State of Colorado, by Clarence L. Ireland at Attorney General of the State, and for answer to the amended original bill of complaint of complainant, the State of Wyoming:

First: It admits the allegations of the First, Second, Third, Fourth, Fifth, Sixth and Seventh numbered paragraphs of said complaint.

Second: Answering the "Eighth" numbered paragraph, it denies that the gauging and measuring devices installed by this defendant do not accurately gauge and measure the full amount of water diverted by means of and through the [fol. 102] designated lawful diversions as defined in the said decree of this Honorable Court; and alleges that all of such measuring equipment is standard and adequate for making proper measurements; and defendant is ready and willing to permit the complainant and its accredited officials to check all of such equipment; and the defendant is also ready and willing to make, or cause to be made, any proper improvements in such measuring devices or methods of measurement to the reasonable satisfaction of the plaintiff, and will furnish to the plaintiff a reproduction record of gauge heights and daily diversions and all information necessary to enable plaintiff accurately to check and verify the same.

Third: It denies that it has permitted water to be diverted from the Laramie River and/or its tributaries by means of and through the Laramie-Poudre tunnel diversion in excess of 15,500 acre-feet per annum; it denies that during the year 1926, there were diversions through said tunnel of 13,572 acre-feet; it denies that diversions in such quantities were shown by the official records of Colorado. As to the allegation of said "Ninth" numbered paragraph concerning unreported diversions through said tunnel in the amount of over 3,000 acre-feet, defendant alleges that, during the year 1926, the "Skyline Ditch" (the ditch referred to in the former decree of this Court) broke and remained for some time in a state of disrepair, incapable of carrying the water to which the owner of said ditch was entitled, and thereupon, by arrangement between such owner and the owner of the Laramie-Poudre tunnel, the water to which the Skyline Ditch was entitled was carried through and by means of the Laramie-Poudre tunnel, to the extent of approximately 583 acre-feet.

Admits that the records of the Division Engineer certified to by him show a diversion of 5,644 acre-feet through the tunnel, and alleges that the diversion through said tun-

nel in said year was 5,644 acre-feet and no more, being [fol. 103] 5,061 acre-feet on account of the tunnel appropriation and 583 acre-feet on account of the Skyline appropriation.

Fourth: Answering the "Tenth" numbered paragraph of the complaint, the defendant admits that, as set forth in said decree, the State of Wyoming was found to be entitled to water from the Laramie River for the purpose of irrigating lands in said state in excess of the amount of water to which the State of Colorado was found to be entitled for irrigating lands in Colorado, but for its exact provisions defendant refers to said decree; admits that the State of Wyoming has an interest in the appropriation, diversion and measurement of the waters of the Laramie River and its tributaries in Colorado. Answering the charge that defendant, although requested in writing for permission to install its own standard gauging devices and make its own measurements of diversion of water from said Laramie River and its tributaries in Colorado, denied such request, defendant alleges that the State Engineer of Colorado, the official in general charge of supervision of irrigation in the state, invited the officials of Wyoming to check all measuring equipment installed for making proper measurements, together with all data obtained by Colorado officials in connection with the same, and then offered to make any proper improvements in devices or methods of measurement, as suggested by plaintiff, but said offer was thereupon declined, and it was then demanded in behalf of Wyoming that all such measurements and equipment be placed under the supervision of a representative of the United States Geological Survey, which demand was denied for the reason that the State Engineer could not agree conformably with the duties of his office to surrender the control which the statutes of the state impose upon him; and hereunder the State of Colorado avers that the transmountain diversions from the Laramie River for carriage of water in the Cache la Poudre River vitally affect and concern all existing water rights in said Cache la Poudre River in Colorado.

[fol. 104] The defendant is ready and willing now, and for the future, to permit access to all of such measuring devices, and to cooperate with the officials of the plaintiff, to the end of assuring at all times accurate measurements

of all transmountain diversions made of the waters of the Laramie River in Colorado. Defendant alleges that all of the devices in use and all of the measurements made in the past are standard, proper and accurate, to the best of defendant's knowledge, information and belief; and defendant further alleges that, for the past four years the State of Wyoming has actually been making its own measurements and consulting the records of measurements made by its own officials and by the Colorado water officials as to the transmountain diversions from the Laramie River in Colorado.

Fifth: For answer to the "Eleventh" numbered paragraph of said complaint, the defendant disclaims and denies any intent on its part to violate or to disregard the said decree and the terms thereof, or the injunction therein contained against the alleged excessive or otherwise unlawful diversions of water therein referred to; and hereunder alleges that the Attorney General of the State of Colorado and the officials charged with the supervision and control of water diversions in the State of Colorado, in administering and controlling such diversions from the Laramie River, have in good faith considered and believed that the proviso incorporated in the decree of this Court that the same should not prejudice the right of the State of Colorado to continue to exercise the right existing thereby recognized to divert and take from such stream and its tributaries certain quantities of water under certain appropriations theretofore made, did not operate as a limitation upon the enjoyment of such appropriations perfected in the state prior to the entry of the said decree to the extent of their beneficial use as enjoyed prior to the entry of the said decree.

Sixth: It admits that there was diverted through and by means of the Skyline Ditch, as alleged in the "Twelfth" [fol. 105] numbered paragraph of the complaint, 22,150 acre-feet of water in the year 1927, and 19,397 acre-feet of water in the year 1928. It denies that 24,363 acre-feet of water was diverted in the year 1929, and alleges that in said year 23,686 acre-feet and no more was so diverted.

In connection with this admission, the defendant alleges that, during none of the said years was there a total diversion from the Laramie River and its tributaries in Colorado in excess of the total of 15,500 acre-feet in connection with

the Laramie-Poudre tunnel appropriation, and 18,000 acre-feet in respect of the Skyline Ditch appropriation, and 4,250 acre-feet in virtue of and through the meadowland appropriation in that state, together with the relatively small amount of water appropriated from the headwaters of Deadman Creek by and through what is designated as the Wilson Supply Ditch, save only in the year 1929, in which year as appears by the records 23,686 acre-feet was diverted by the Skyline Ditch, 8,916 acre-feet by and through the Tunnel appropriation, 600 acre-feet by means of the Columbine Ditch, and 1,140 acre-feet by means of Bob Creek Ditch, in addition to the diversions by the "meadow" appropriators and by the Wilson Supply Ditch. For the years 1927 and 1928 a quantity of water substantially less than 37,750 acre-feet, in addition to the water appropriated by means of the Wilson Supply Ditch was so diverted.

Defendant alleges that, according to its understanding of the force and effect of the decree of this Court, the plaintiff is without just or legal ground for complaint with respect to such diversions, so long as the total of diversions permitted in Colorado is not exceeded; and that such permitted total of diversions was awarded or recognized in Colorado as a unit, and that such total quantity is and of right should be administered and allowed to be diverted by the several appropriators thereof as their several rights inter se appear, and that this Court has not undertaken to allocate fixed quantities severally to the individual consum-[fol. 106] ers, and all matters in controversy between said several consumers are for determination in the courts of the defendant unprejudiced by the determination of this court other than its limitation to a permitted maximum of the total of such diversions.

Seventh: Answering the "Thirteenth" numbered paragraph of the complaint, it denies that during any of the years 1926, 1927, 1928 and 1929, there was diverted away from and taken in the State of Colorado by its officials, or agents, or representatives, or other citizens, or residents, or corporations, from the Laramie River and its tributaries in Colorado, amounts of water for irrigation of acreage in excess of the amounts by said decree authorized for the purpose of irrigating 4,250 acres of meadow lands in the State of Colorado; denies that there was used or consumed in the State of Colorado for irrigating meadow lands any amount

of water in excess of 4,250 acre-feet; denies that there was taken from the Laramie River for irrigating meadow lands in the Laramie River valley in Colorado in any of said years any amount of water such that the supply available at the state line between Wyoming and Colorado was thereby reduced in excess of 4,250 acre-feet.

Defendant denies that during any of said years there was irrigated more than 4,250 acres of natural hay meadows.

With respect to the charges in said "Thirteenth" paragraph concerning excessive diversions during the four years specified, defendant states that irrigation as practiced on these mountain "meadow lands" is by the so-called "flooding" system, in which the water is turned out on the meadow lands and permitted thereafter to run through the irrigation season of from 50 to 60 days. That the valley of the Laramie River, in which this method of irrigation is practiced, is in most places not in excess of one-half mile in width, and the land is underlaid with gravel, and, upon applying the water, the same returns almost immediately to the several streams, either by surface flow or through said gravel, [fol. 107] and such diversions do not substantially diminish the flow, and the water is re-diverted several times over before it leaves the state. The method of use and application of water as practiced in Colorado is identical with that followed in the mountain valleys of the Laramie and Little Laramie in Wyoming, and in both states it is and at all times has been the common practice in irrigation of native hay meadows to divert large quantities and to keep the water flowing and circulating without cessation across the meadows and back to the stream throughout the growing season.

That is would be wholly impracticable satisfactorily to operate these "meadow" ranches if the several Colorado appropriators were limited to a total of 4,250 acre-feet as measured at the headgates of the respective irrigation ditches; that in the former suit of the State of Wyoming against the State of Colorado, no complaint was made by plaintiff as to the method of use practiced by the several appropriators owning the so-called "meadow" appropriations, nor was such method in any wise attacked or questioned in the testimony adduced or arguments presented in that case. Such method of irrigation had been practiced since the time of original settlement of said ranches. That it was shown by the said testimony that the actual loss, or

consumption of the flow of the Laramie River each year resulting from this system of irrigation was one acre-foot per acre, although it likewise was disclosed in such evidence that many times that amount was diverted and returned to the river during the process of meadow irrigation, and that the diversion of the additional amounts of water caused no other loss to the river supply. This same practice and method has been followed without change since the date of the entry of decree in said former case. Defendant alleges that no more acreage of meadow lands is being irrigated than was irrigated in Colorado previous to and at the time of the former trial, and that the same amount of water is being consumed annually in the irriga-
[fol. 108] tion of said meadows as was consumed previous to said trial.

Defendant concedes that under the decree rendered in such former case, these mountain appropriators should be limited to the ditches constructed and in operation prior to the entry of the former decree; and that the number of acres of hay meadows irrigated should not be exceeded, and is willing to assure to plaintiff that the same shall not be exceeded, and to afford all cooperation necessary to that end, or otherwise to abide the decree of this court in the matter of affording such adequate assurance to the plaintiff, but avers that the former decree of this court is not susceptible to the construction that the meadow appropriations are subjected to a limitation of 4,250 acre-feet of diversions measured at the headgates of the respective ditches.

Eighth: For answer to the charges contained in the "Fourteenth" paragraph of the complaint, the defendant states:

I.

As to the Bob Creek Ditch, the location, description and capacity thereof are admitted as stated, and likewise as to the "small ditch" mentioned in the second subdivision of said paragraph "Fourteen," and the diversions as stated are likewise admitted, save that, according to the report in the office of the State Engineer, the quantity diverted in the year 1929 was 1140 acre-feet and not 1153 acre-feet as stated.

With respect to the charge of diversions by means of the Bob Creek Ditch and Bob Creek Ditch Extension occurring on the 17th of June, 1932, defendant states that, subsequent to the decision of this Court rendered on May 31, 1932, the State Engineer of the State of Colorado was not immediately informed as to the scope and effect of said decision, and that upon said 17th day of June, 1932, the matter of said diversions was for the first time definitely called to [fol. 109] his attention, and he was then advised by the Attorney General of the said State that he should not permit further diversions of water by means of said ditches until the further order of the court in the premises, and said diversions were thereupon ordered stopped, and from and after the 18th of June, 1932, they have ceased.

With respect to the Columbine Ditch, the existence, location, description and dimensions as stated in subdivision 3 of paragraph "Fourteenth" are admitted, and likewise the diversions, as stated, by means of the said ditch in the years 1922 to 1929, inclusive, are admitted, save only the diversion as stated in the year 1922, in which year, according to the records of the office of the State Engineer, no water was diverted instead of 181 acre-feet as stated.

As to the charge concerning diversion practiced by means of this ditch on the 17th of June, 1932, said diversion ceased on the 18th of June, 1932, under order of the State Engineer, which order was obeyed under the circumstances hereinabove stated concerning the diversions by the Bob Creek Ditch and its extension.

And further with respect to said Bob Creek Ditch, said Bob Creek Ditch Extension, and Columbine Ditch, the defendant alleges that said ditches are now the properties of the Mountain and Plains Irrigation Company. The Bob Creek Ditch diverts its supply of water from Bob Creek, also known as Nunn Creek and certain other unnamed tributaries of said Bob or Nunn Creek, which is a tributary of Laramie River. Work on this ditch was commenced by survey September 24, 1897, and on October 17, 1898, a survey was commenced for an extension of the original project of Bob Creek Ditch. This extension discharges its water into the head of the original Bob Creek Ditch across the channel of Bob Creek. The owner claims that the work of the construction of the original project was completed in the year 1902. The extension ditch above mentioned was completed in the year 1920. The waters collected in and

diverted by Bob Creek Ditch and Bob Creek Extension are [fol. 110] used for the irrigation of agricultural lands in the Counties of Larimer and Weld. Such waters are delivered into the main channel of the Cache la Poudre River and stored by means of exchange in a reservoir known as Gilmore Reservoir or in a reservoir known as Portner Reservoir. Bob Creek Ditch and the extension were conveyed by the Larimer and Weld Reservoir Company, the original owner thereof, on October 29, 1919, and by mesne conveyance became vested in the Mountain and Plains Irrigation Company on June 29, 1920.

The Bob Creek or Nunn Creek diversions occur at an altitude of approximately 9,975 feet, and the run-off period is from about the 16th of May until the 17th of July, the peak run usually occurring about June 1st. The maximum capacity of the ditch is approximately 55 cubic feet of water per second, but due to the elevation and the limited area of run-off, a comparatively small amount of water is capable of diversion, the maximum actual diversion to date having been the amount of 1174 acre-feet, diverted in the year 1923.

II

With respect to the Columbine Ditch: This diverts its supply of water from Deadman Creek and Columbine Creek, and is now the property of the Mountain and Plains Irrigation Company. The water diverted and carried by means of this ditch is discharged into the North Fork of the Cache la Poudre. Said Deadman Creek and Columbine Creek are tributaries of the Laramie River.

The work commenced on said ditch by survey begun September 7, 1897.

Columbine Ditch Extension, also the property of the Mountain and Plains Irrigation Company, diverts its supply of water from a certain ravine located on the east line of Section 15, Township 10 North, Range 75 West of the 6th P. M., in Larimer County, Colorado, the headgate being located about 1120 feet north of the southeast corner of said [fol.111] Section 15. The general course of the ditch is in a southerly direction, discharging its water into the North Fork of the Cache la Poudre River. Work was commenced on this extension by survey September 17, 1898.

By mesne conveyances these ditches became the property of the Divide Canal and Reservoir Company, the Col-

umbine Ditch becoming part of the so-called "Sand Creek Ditch System."

The original project was to divert water from Deadman Creek into Sand Creek, and from Sand Creek by another ditch into Sheep Creek, thence through Sheep Creek into the North Fork of the Cache la Poudre River, whence it would find its way to the main stream of the Cache la Poudre. However, for the purposes of the Divide Canal and Reservoir Company it was found that the original project was not feasible, and by deed dated October 4, 1919, said company conveyed by quitclaim deed to Roy A. Portner the Columbine Ditch, and thereafter Portner, on October 27, 1920, conveyed the ditch to the Mountain and Plains Irrigation Company.

This ditch is located at an altitude of approximately 9,500 feet, and the run-off period is limited to approximately from May 16th, to July 17th, the peak of flow being reached about the 1st of June.

The facts with respect to utilization of the water diverted and carried by means of this ditch are identical with those stated concerning the Bob Creek Ditch.

Since the acquirement of the Columbine Ditch and Columbine Ditch Extension by the Mountain and Plains Irrigation Company, they have been maintained and operated by said company during the irrigation season and water diverted in each season when available for such diversion, and by reason of the diversions and applications to beneficial use of water obtained from said Bob Creek and Columbine systems, vested rights were claimed to appropriations for the same as of the dates herein stated of com- [fol. 112] mencement of work by the said Mountain and Plains Irrigation Company and the diversions made as charged in the complaint were made under such claim of right.

III

Answering the fourth subsection of said paragraph "Fourteenth," concerning the "Lost Lake System," defendant admits the existence, location, capacity and use of the several lakes referred to, and states that the construction of Lost Lake commenced in the year 1890 and resulted in the storage of water and diversion through Chambers Lake by the Water Supply & Storage Company in the

spring of 1891. The reservoir was constructed by placing a dam across an unnamed gulch tributary to the Laramie River, and impounding water to a depth of 15 feet. The outlet from this reservoir is into Chambers Lake and thence down the Poudre, and storage at the depth mentioned gives an estimated capacity of 12,541,030 cubic feet, or approximately 288 acre-feet.

Laramie Lake was constructed at the same time as Lost Lake, and water was stored and used for irrigation in the spring of 1891. The dam was 11 feet in height, with an estimated capacity of 14,817,744 cubic feet, or approximately 340 acre-feet. The outlet from this lake is into Lost Lake and the water is taken through Lost Lake and into Chambers Lake, and thence down the Cache la Poudre.

The Lily Lakes construction was commenced on June 1, 1912, and water was stored and used for irrigation purposes in the spring of 1913. There is a storage depth in this reservoir of 5 feet and an estimated capacity of 7,747,189 cubic feet, or approximately 178 acre-feet. The outlet to this reservoir is through Laramie and Lost Lakes into Chambers Lake.

These lakes are small and their filling is uncertain. The "Lost Lake System" is not connected with the "Skyline" Ditch. They, however, have the same outlet into Chambers [fol. 113] Lake, and are operated under the same general plan, and the lake system supplements the other diversion, and both together make up what is termed the "Laramie River Diversion of the Water Supply & Storage Company." Defendant states that, in accordance with its understanding of the force and effect of the former decree of this Court, it should not be construed so as to prohibit the continued operation of the "Lost Lake System" in connection with the permitted diversion of the Water Supply & Storage Company and as an adjunct to its "Skyline Ditch" diversion, so long as the permitted amount of 18,000 acre-feet is not exceeded.

With respect to the charge in the sixth subsection of said paragraph "Fourteenth," concerning the storage of water in Lost Lake, Laramie Lake and Lily Lake, on the 17th day of June, 1932, defendant states, at a time when the permitted diversion by the Water Supply & Storage Company, through its Skyline Ditch, in the amount of 18,000 acre-feet had not been exceeded, the State Engineer of the State of

Colorado, by order, directed and required the cutting of the dykes of the said lakes so that the quantity of water therein impounded became available to the appropriators of water of the Laramie River in the State of Wyoming, and that such cutting of dykes occurred on or about the 21st of August, 1932.

IV

Defendant answering those portions of the "Fourteenth" paragraph of the amended bill of complaint pertaining to The Wilson Supply Ditch, and particularly the first or unnumbered paragraph thereof, and subdivisions 5, 6, 7, and 8, and all of the "Fifteenth" paragraph says:

That The Wilson Supply Ditch, and the Deadman or Deadman Feeder Ditch, the Deadman Ditch, the Divide Ditch, and Sand Creek Ditch, and the alleged Deadman Extension Ditch, mentioned and described in said amended complaint, are all one and the same ditch, and are the same ditch mentioned and described in the evidence in the former [fol. 114] trial in this matter, and in the modified decree therefor, entered by this court October 9, 1922, and set forth in substance in the seventh paragraph of the amended complaint, in all of which said ditch is named and described as The Wilson Supply Ditch.

Defendant denies that there is any separate ditch, or portion of ditch, known as the "Deadman Extension Ditch," and states that the portion of ditch mentioned and described in said subsection 6 of the "Fourteenth" paragraph is merely a section of the Deadman Feeder Ditch, located near the central part of said ditch, and the same is not an extension or an enlargement thereof, but on the contrary the same now is, and at the time of the original construction of said ditch was, a portion thereof; that the "Deadman Feeder Ditch" of the Wilson Supply Ditch heads or connects with Sand Creek near the head waters thereof, at a point in the northwest quarter of section 15, township 10 north, range 75 west, and extends thence in a general southerly direction with many winding courses following the contour of the mountain side through sections 15, 14, 22, 23 and 26, township and range aforesaid, and terminates at a point about 950 feet north of the quarter corner of said section 26, and the entire length is about 5 miles. That the whole thereof was originally constructed as one ditch, and appropriations of water were made thereby and there-

for, as of the date of June 15, 1899, and ever since said entire line of ditch has been maintained and used to take and collect and divert water along the line thereof, and discharge the same into Sand Creek, which is used as a part of The Wilson Supply Ditch; that from the said point of discharge said water is carried in Sand Creek to a point near the south line of section 22, township 11 north, range 75 west, at which point all the waters collected by the Deadman Ditch, together with the waters appropriated from Sand Creek, are diverted from Sand Creek through and across the divide and into Sheep Creek, by an open ditch and tunnel, sometimes called "Divide Ditch" and some-[fol. 115] times "Sand Creek Ditch," but the same, however called, is a portion of The Wilson Supply Ditch.

That the upper or southerly portion of the Deadman Feeder Ditch as originally constructed and since maintained was 3 feet wide on the bottom, 7 feet at highwater line, and carried water 3 feet deep and had a capacity of 50 second-feet or more, for the first 3 miles and then for a short distance it was 4 feet wide on bottom, and for the last 1.3 miles before discharging into Sand Creek it was 8 feet on bottom and 13 feet wide at high water line, and carried water 3 feet in depth, with a grade of 5 feet or more per mile, and a carrying capacity of approximately 130 second-feet, as stated in said amended bill of complaint.

That said The Wilson Supply Ditch, where the same connects Sand Creek with Sheep Creek, was and is constructed 10 feet wide on the bottom, 16 feet wide on top, and carried water 5 feet in depth, with a grade of 10 feet per mile, and a capacity of approximately 300 second-feet. That said The Wilson Supply Ditch was all constructed as one enterprise, and of the foregoing dimensions and capacity, and work of construction thereof was begun in June, 1899, and an appropriation of water therefor was made as of date of June 15, 1899, in the amount of 288 second-feet from the waters of Sand Creek and from Deadman Creek and tributaries jointly, and said appropriations of water are the same shown in the evidence in the former trial and mentioned and described in the modified decree of this court entered October 9, 1922. That in the year 1904, pursuant to the laws of Colorado, a proceeding was duly commenced in the district court of Larimer County, Colorado, to adjudicate appropriations of water in water district No. 48 in State of Colorado, which includes Laramie River, and

said proceeding was case 1885 in said court, entitled "In the matter of the adjudication of priorities of right to water in water district No. 48, division No. 1 of State of Colorado."

That the owner of The Wilson Supply Ditch appeared in [fol. 116] said proceeding and filed its statement of claim, and submitted proof concerning the same, and on October 11, 1906, said court made and entered a decree of and concerning said The Wilson Supply Ditch and its appropriations of water, therein described as "The Sand Creek Ditch System," which decree awarded said ditch priority No. 38, in said water district, as of the date June 15, A. D. 1899, in the amount of 288 second-feet, from the waters of said Deadman Creek and tributaries, and Sand Creek, in the State of Colorado, which said appropriations of water were made long prior to the year 1902, and are the same appropriations of water mentioned and confirmed to said The Wilson Supply Ditch by the modified decree of this court in the former proceedings on October 9, 1922, and not otherwise.

That the water available under said appropriation can be procured for only a short period of time during each year, and then only in variable amounts, from day to day, and by reason of the cold weather the daily run often varies as much as 50%, on account of the thawing and frezing weather at said altitude. That the water supply available varies greatly from year to year in accordance with the quantity of snow which falls on the watersheds of said creek; that occasionally for a few hours in a day the full amount of the appropriation can be procured for a few days in the season, often only 10 to 25 second-feet of water can be procured to supply said appropriation; that water can be procured only from about the middle of May to about the first of July in any one year varying according to the season.

That during each year since the initiation of said appropriation, the owner of said ditch has diverted such water as was available and defendant states on information and belief that of the water annually diverted, about 60% thereof is obtained from Deadman Feeder of The Wilson Supply Ditch, and the remaining part from the waters of [fol. 117] Sand Creek, which proportions also vary from time to time, according to the amount of water in said streams.

Admits that during the year 1929 and 1930, the owner of said The Wilson Supply Ditch did some work of surveying and making repairs on that portion of said ditch mentioned in the sixth subdivision of paragraph "Fourteen" of the amended complaint, and said work of cleaning and repairing was done upon about a mile of the central portion of the Deadman Feeder Ditch. On information and belief defendant states that said potrion of said ditch was so constructed on the mountain side that it was difficult to maintain the lower embankment thereof, and keep it from caving or breaking; that in order to strengthen the bank and make it more secure, it was necessary in getting material therefor, to take earth from the inside of said ditch, and in so doing, it widened the ditch at said point; that said work of repair was done solely for the purpose of strengthening the embankment, and not for the purpose of widening the ditch to carry more water; that no more water was taken or carried in said portion of said ditch so repaired than theretofore; that such work of repair is frequently necessary on any irrigation ditch, and particularly a ditch built on the mountain side; that since said repair work no greater quantity of water has been taken through said portion of said ditch than before, and there is no intention to take or divert more water by reason of the said repair work.

Defendant denies that the owner of said The Wilson Supply Ditch has taken or diverted any water from the tributaries of the Laramie River or Sand Creek contrary to, or in violation or disregard of, the terms of said modified decree authorizing the diversions of water by said The Wilson Supply Ditch.

Defendant admits the allegations concerning that portion of The Wilson Supply Ditch and its appropriations of water contained in subsection 5 of the "Fourteenth" para- [fol. 118] graph of the bill, save that it states that the head of said ditch or point of connection with Sand Creek is located in the northwest quarter of section 15 instead of southeast quarter thereof and avers that the grade of said ditch is more than 5 feet per mile.

Answering the matters stated in subsections 6, 7 and 8 of said "fourteenth" paragraph of the bill, defendant denies that there is any portion of The Wilson Supply Ditch known as "Deadman Extension Ditch," and denies that

there is or has been any extension or addition made to said ditch since the original construction thereof, as hereinbefore stated.

Defendant admits that the upper portion of the Deadman Feeder Ditch for the first 3 miles was 3 feet wide on the bottom, 7 feet wide at high water line, and carried water 3 feet in depth, and 5 feet or more in fall, and the capacity of 48 second-feet or more, and that for the lower 1.3 miles thereof the dimensions and capacity are as stated in the fifth subdivision of said paragraph.

Ninth: With respect to the matters set forth in the "Fifteenth" paragraph of the Amended Complaint, defendant admits that the modified decree heretofore entered by this court on October 9, 1922, recognized the appropriations of The Wilson Supply Ditch and confirmed to the owner thereof the right to continue to divert from Deadman Creek and its tributaries the amount of water appropriated thereby prior to the year 1902, being the existing appropriations of said ditch, and defendant avers that said existing appropriations were made as of the date June 15, 1899, both from Deadman and Sand Creek, and said appropriations had been used and enjoyed until the rendition of said modified decree and have since been so used and enjoyed. Denies that the owner of said The Wilson Supply Ditch had not made an appropriation of water therefor prior to the year 1902, and, on the contrary, avers that the appropriations [fol. 119] of water for said ditch were made and perfected as of June 15, 1899, the date when said ditch was constructed, and not otherwise.

Defendant admits that in June, 1932, the owner of The Wilson Supply Ditch diverted water through Deadman Feeder Ditch and also from Sand Creek, but denies that said diversion was unlawful, injurious to plaintiff, or contrary to the terms and provisions of said modified decree, or that the same was in violation of the rights of any other appropriator from said Sand Creek.

Defendant admits that the map marked exhibit "A" and attached to the amended complaint shows, for illustrative purposes, the location of The Wilson Supply Ditch and the several portions thereof, under the various names used in relation thereto, and avers that if a line were drawn from the point of the lower or Deadman Ditch (arrow) to the upper or Divide Ditch (arrow) the same would show the

line of Sand Creek and connection between two portions of The Wilson Supply Ditch or said Sand Creek Ditch system.

Tenth: Admits the allegations of the "Sixteenth" paragraph of the Amended Complaint concerning the pendency in the district court of Larimer County, Colorado, of applications filed on behalf of the Water Supply & Storage Company, as owner of Laramie Lake, Lost Lake and Lily Lake, for the purpose of having decreed to said owner the authority to divert and store water for irrigation purposes in said reservoirs.

Eleventh: Defendant likewise admits the allegations of the "Seventeenth" paragraph of the Amended Complaint concerning the pendency in the district court of Larimer County, Colorado, of applications on behalf of Mountain and Plains Irrigation Company for adjudication of rights of Bob Creek Ditch, sometimes known as Nunn Creek Ditch, and the facts in said paragraph stated concerning the allegations of the petition of said The Mountain and Plains Irrigation Company.

With respect to the charges of the "Sixteenth" and [fol. 120] "Seventeenth" paragraphs of the Amended Complaint, concerning the pendency of such adjudication proceedings in the district court of Larimer County, defendant states its understanding of the force and effect of the former decree of this Court to be that such district court should properly proceed in the matter of such adjudication of rights of the respective claimants of water from the Laramie River in Colorado without interference, and that this Court is not concerned with such adjudication or with diversions practiced under rights therein to be adjudicated so long as the recognized and permitted amounts of diversions are not exceeded.

Twelfth: Defendant admits that the topographical map of the watershed of the Laramie River and its tributaries in Colorado, attached to the Amended Complaint and marked "Exhibit A," shows for illustrative purposes the location of the diversions described in the Amended Complaint, but denies that it is a complete or accurate showing of such locations.

Thirteenth: Defendant admits the facts of the conferences as alleged in paragraph "Nineteenth" of the Amended Complaint, and that thereat assertion was made on be-

half of Wyoming that diversions of water made in Colorado were excessive and unlawful, and that such assertion was denied by and on behalf of Colorado.

Defendant admits that the officials of Colorado, replying in writing to the protest of the State of Wyoming, stated that they were at all times willing and anxious to abide by the terms of the decree of this Honorable Court, and defendant states that it is now willing to abide such decree; and states that the greater part of the controversy then existing between the parties was due to a difference of opinion as to the force and effect of the said decree, the defendant then contending that the said decree was not susceptible to the construction that thereby the vested appropriations of Colorado appropriators other than the owner of the tunnel [fol. 121] appropriation were curtailed, limited, or divested by reason of the proviso of the said decree.

Fourteenth: For answer to the "Twentieth" paragraph of the Amended Complaint, the defendant denies the allegations thereof and disavows any intention or purpose to increase the diversion of water from the Laramie River and its tributaries for irrigation of lands in Colorado, and states that its purpose is strictly to abide by and obey the decree of this Court entered in the former proceeding and also the decree herein to be rendered.

Defendant, however, states that when the water is available it will permit the diversion through the Laramie-Poudre tunnel, by its feeders, ditches and headgates leading thereunto from the Laramie River and its tributaries in Colorado, of an amount of water up to the maximum permitted by said decree; and denies that thereby the amount of water determined by said decree as being available to Wyoming as against said diversion by citizens of Colorado will be reduced or consumed, or that Wyoming thereby will be deprived of protection under said decree to the use of water to which it was determined by said decree to be entitled. And defendant further states that, with respect to the so-called "meadow" appropriations, unless and until otherwise directed by order of this Court, it will permit their utilization in manner as they have been wont to be used and enjoyed, to-wit, by the method of "flooding" as herein fully described.

And further defendant admits that, until otherwise directed, it will continue to permit the diversion by the owner

of The Wilson Supply Ditch of the quantities of water available for diversion by means of such ditch, said use not having been changed nor the diversion increased since the date of the decree of this Court in the former suit, and the appropriation therefor having vested prior to the year 1902.

Defendant further states that, when water is available, it [fol. 122] will permit the diversion through the "Skyline" Ditch from the Laramie River of an amount of water up to the maximum permitted by said decree.

With respect to the allegations of the Amended Complaint concerning diversions by Columbine and Bob Creek Ditches and by means of the so-called "Lost Lake System," defendant states its purpose to be to prevent the same until the further order of the Court in the premises, being thereunto apprised by decision of this Court rendered May 31, 1932. The defendant, however, states its understanding of the force and effect of the former decree to be that the State of Colorado is limited to 37,750 acre-feet plus the amount to be determined herein to be available to the Wilson Supply Ditch, and that the decree of this Court did not undertake to make a determination of the respective rights of the several appropriators in Colorado in such permitted maximum of total diversion, and that the division of such total award may of right be made by the district court of Larimer County, Colorado, or other court of appropriate jurisdiction in the said state.

The defendant disavows and disclaims any intent or purpose on its part in connection with any of the matters set forth in the Amended Complaint to disregard or violate the decree of this Court as heretofore rendered, or to disobey in any respect the decree to be herein rendered.

[fol. 123] For Answer to the Second Cause of Action:

First: Defendant refers to the admissions, denials and allegations set forth in its defense to the First Cause of Action, and makes all the said matters and things set forth in said defense part of this its defense to the Second Cause of Action, to the same effect as though herein specifically set forth.

Second: It admits the request set forth in the "Second" paragraph of said Second Cause of Action and the denial thereof, and that the State of Wyoming has an interest in said water of the Laramie River watershed, by virtue of the

decree of this Court; denies that Wyoming is compelled to rely on the measurements made by the State of Colorado, and, on the contrary, states that Wyoming is permitted free access to make its own measurements in the State of Colorado, and to inspect and check upon the measurements and measuring devices of the State of Colorado along its streams and tributaries from the Laramie River, and has for several years last past been doing so, and Colorado is willing that it shall continue to do so.

Third: It denies the allegations of the "Third" numbered paragraph in said Second Cause of Action in respect of permitting the State of Wyoming to install structures in the Laramie River and its tributaries in the State of Colorado or in any trans-mountain ditches, lakes or reservoirs, by means of which water is being or may be diverted in the State of Colorado from said water-courses, lakes and reservoirs; alleges that there is no necessity for such installation; denies that said installation of gauges, measuring devices or structures of any kind, or measuring of such waters, should be carried on by the federal government at the expense of either of said states.

Wherefore, the State of Colorado, having fully answered the Amended Bill of Complaint, and having made full dis- [fol. 124] closures with respect to the several acts charged against it, and also having set forth the several rights of its citizens and appropriators of the waters of the Laramie River in Colorado, affirms its desire to abide by the determination of the Court and in all things to conform to its decree as to the matters presented in the Amended Bill of Complaint. Defendant submits, however, that beyond quieting the rights of the State of Wyoming and the State of Colorado and their respective representatives, citizens, and residents, in the waters of the Laramie River in Colorado conformable to the issues herein, no further action by this Court is required.

The State of Colorado, by Clarence L. Ireland, Attorney General; George A. Crowder, Deputy Attorney General; E. J. Plunkett, Assistant Attorney General; Paul W. Lee, Special Counsel, Solicitors for Defendant.

[fol. 125] *Duly sworn to by Clarence L. Ireland. Jurat omitted in printing.*

STATE OF WYOMING,
County of Laramie, ss:

Service of a copy of the Answer of the State of Colorado to the Amended Original Bill of Complaint in the case of State of Wyoming vs. State of Colorado, Original No. 15, is hereby acknowledged to have been received by me, this — day of ——, A. D. 1932.

James A. Greenwood, Attorney General of Wyoming, and Solicitor for Complainant.

[fols. 126 & 127] SUPREME COURT OF THE UNITED STATES

[Title omitted]

ORDER GRANTING TIME WITHIN WHICH TO FILE REPLICATION TO ANSWER—Filed Oct. 10, 1932

The State of Wyoming is granted until and including the first day of November, 1932, within which to present and file a replication to the answer of the State of Colorado to the amended bill filed herein.

[File endorsement omitted.]

[fol. 128] [File endorsement omitted]

[fol. 129] IN SUPREME COURT OF THE UNITED STATES

[Title omitted]

REPLICATION OF THE COMPLAINANT, STATE OF WYOMING, TO THE ANSWER OF THE DEFENDANT, STATE OF COLORADO—Filed Oct. 31, 1932

The complainant, State of Wyoming, repliant, saving and reserving unto itself all manner of advantage of exception to the manifold insufficiencies of the answer of the defendant, The State of Colorado, for its replication thereunto, saith that it will prove the allegations of its amended bill of complaint to be true; that as to the additional and new matter alleged in said answer, material or effectual, to be replied unto, repliant avers and states as follows:

[fol. 130] I

Repliant, for its reply to the new matter alleged in Paragraph Third of defendant's answer, denies that 5,644 acre-feet of water was the full amount diverted from the Laramie River by and through the Laramie-Poudre Tunnel in the year 1926, and avers that the amount of said diversion by and through said Laramie-Poudre Tunnel during the year 1926 was in excess of 15,500 acre-feet, as alleged in Paragraph Nine of repliant's amended bill of complaint. Repliant denies that said excess diversion was caused by the Sky Line Ditch being in a state of disrepair.

II

Repliant, for its reply to the new matter alleged in Paragraph Fourth of defendant's answer, denies that the officials of Wyoming were accorded an opportunity to check all the data obtained by Colorado officials relating to the measurements of the quantities of water diverted from the Laramie River in the State of Colorado, and avers the fact to be that upon requesting permission to examine reports of diversions from the Laramie-Poudre Tunnel during the years from the entry of said modified decree on October 9th, 1922, to and including the year 1930, said officials of the State of Colorado advised that the reports containing the data relating to the measurements of the water diverted by said Tunnel had been destroyed and were not available; and further avers that repliant was refused permission to come upon the private property in Colorado where such measuring devices were installed.

Repliant further avers that permission of defendant to examine and inspect measuring devices installed by defendant, State of Colorado, for measuring the quantities of water [fol. 131] diverted from the Laramie River in Colorado will not be of any benefit because repliant has no means of asserting any authority or control over such measuring devices except through and by means of the jurisdiction of this Honorable Court; and repliant further avers that defendant State of Colorado has refused and denied the repliant the right to mutually operate such measuring devices or to have any authority or control over the installation or operation thereof; denies that transmountain diversions from the Lar-

amie River vitally affect and concern all existing water rights in the said Cache la Poudre River in Colorado.

Repliant denies that all of the devices in use, and all of the measurements made in the past are standard, proper and accurate; denies that, for the past four years, the repliant has actually been making its own measurements and consulting the records of measurements made by its own officials and by the Colorado officials as to the transmountain diversions from the Laramie River in Colorado.

III

Repliant, for its reply to the new matter alleged in Paragraph Fifth of defendant's answer, avers that defendant has at all times fully understood the scope and import of the decree of June 5th, 1922, and the modified decree of October 9th, 1922, as entered in Case Originai No. 3, State of Wyoming vs. State of Colorado, et al., limiting the right of defendant in the use of the waters of the Laramie River and its tributaries.

[fol. 132]

IV

Repliant, for its reply to the new matter alleged in Paragraph Sixth of defendant's answer, denies that the total diversions of water from the Laramie River in the State of Colorado during the years 1927 to 1929, inclusive, did not exceed 37,750 acre-feet annually, and avers that said total diversions during each of said years was far in excess of said amount; and further avers that the admitted diversions, as set forth in said Paragraph Sixth of said answer, by means of the Bob Creek Ditch, Columbine Ditch, Wilson Supply Ditch, and for the irrigation of the "meadow" lands in the State of Colorado, in excess of 4,250 acre-feet, were and are unlawful and in violation of the provisions of said decrees; denies that a total quantity of water for diversion in Colorado in the amount of 37,750 acre-feet was awarded or recognized in Colorado as a unit, and avers that there was awarded or recognized in Colorado the following specific diversions, only, to-wit:

Through and by means of the Sky Line Ditch, 18,000 acre-feet per annum;

Through and by means of the Laramie-Poudre Tunnel, 15,500 acre-feet per annum;

For the irrigation of "meadow" lands in the State of Colorado, 4,250 acre-feet per annum;

And the relatively small amount of water appropriated prior to 1902 through the Wilson Supply Ditch from the headwaters of Deadman Creek, a Colorado tributary of the Laramie River.

Repliant further denies that such admitted diversions were recognized or awarded in the State of Colorado as a unit.

[fol. 133] V.

Repliant, for its reply to the new matter alleged in Paragraph Seventh of defendant's answer, denies that the water diverted and used for the irrigation of said mountain "meadow" lands in the State of Colorado, returns almost immediately to the Laramie River either by surface flow, or through said gravel sub-surface; denies that such diversions for the irrigation of said mountain "meadow" lands does not substantially diminish the flow of water in the Laramie River; denies that the use and application of water for the irrigation of the mountain valleys of the Laramie River in Colorado by the diversion of water from said stream in excess of 4,250 acre-feet annually, measured by headgate diversions, is a lawful use of the waters of said stream, and avers that the diversion by Colorado of quantities of water in excess of 4,250 acre-feet, headgate diversion, for the purpose of irrigating said "meadow" lands in Colorado, is in violation of the terms of the decrees of this Honorable Court as entered June 5th, 1922 and October 9, 1922, and is in violation of the rights of the repliant with respect to the use of the waters of said stream.

Repliant further denies that no more acreage of "meadow" lands is being irrigated than was irrigated in Colorado previous to and at the time of said former trial, and alleges the fact to be that acreage in excess of 4,250 acres has been so irrigated, to-wit, the amount of 4393.20 acres.

Repliant avers that the amount of 4,250 acre-feet of water, determined by headgate diversion measurements, is the limit of the lawful quantity which defendant is entitled to divert and appropriate from the Laramie River and its tributaries for the irrigation of 4,250 acres of "meadow" lands in the defendant state.

[fol. 134]

VI.

Repliant, for its reply to the new matter alleged in Paragraph Eighth, Part I thereof, of defendant's answer, denies that a survey for the construction of Bob Creek Ditch was commenced on September 24th, 1897; denies that the work of surveying was commenced on October 17th, 1898, on the Bob Creek Extension Ditch, and alleges the fact to be that neither said Bob Creek Ditch, nor Bob Creek Extension Ditch were completed and water diverted and conveyed by means thereof from the water shed of the Laramie River and into the water shed of the Cache la Poudre River prior to 1920, and that prior to 1920, said ditches were not fully constructed or so partially constructed as to be capable of conveying water from said Laramie River water shed to the Cache la Poudre River water shed.

Repliant avers that the construction and/or use of said Bob Creek Ditch and the Bob Creek Extension Ditch for the diversion of the water from the Laramie River water shed on and after the relative rights of repliant and defendant in and to the use of the waters of the Laramie River and its tributaries were determined by the decrees of this Honorable Court entered June 5th, 1922, and October 9th, 1922, in said Original Case No. 3, State of Wyoming vs. State of Colorado, et al., were and are in violation of the terms of said decrees and in violation of the rights of repliant thereunder.

VII.

Repliant, for its reply to the new matter alleged in Paragraph Eighth, Part II thereof, of defendant's answer, denies that a survey for the construction of the Columbine Ditch was commenced September 7th, 1897, and further [fol. 135] denies that a survey for the construction of said Columbine Extension Ditch was commenced on September 17th, 1898; further denies that any vested rights exist in favor of the alleged owners of said Columbine Ditch and/or the Columbine Extension Ditch as against the rights of repliant.

Repliant avers that the construction, operation and use of said ditch and extension ditch for the purpose of diverting water from the tributaries of the Laramie River in Colorado, have been, and are in violation of the terms of said decrees of June 5th, 1922, and October 9th, 1922, as entered

by this Honorable Court in said Original Case No. 3, State of Wyoming vs. State of Colorado, et al., and are in violation of the rights of repliant thereunder.

Repliant further avers that no water was diverted and neither said Columbine Ditch nor Columbine Extension Ditch were capable of use for diverting water from the water shed of the Laramie River to the water shed of the Cache la Poudre River prior to the year 1921.

VIII.

Repliant, for its reply to the new matter alleged in Paragraph Eighth, Part III thereof, of defendant's answer, denies that the construction of the Lost Lake Reservoir was commenced in the year 1890, and denies that water was stored therein and diverted from the Laramie River water shed by means of said reservoir by and through Chambers Lake in the spring of 1891; further denies that Laramie Lake Reservoir was constructed at the same time as Lost Lake Reservoir; denies that Laramie Lake Reservoir was constructed at the time when said Lost Lake Reservoir is alleged to have been constructed, and denies that water was stored therein and used therefrom for irrigation in the [fol. 136] spring of 1891; and further denies that the construction of Lily Lake Reservoir was commenced on June 1st, 1912; denies that water was stored therein and used therefrom for irrigation purposes in the spring of 1913.

Repliant denies that said reservoirs constituting the Lost Lake System, have the same outlet into Chambers Lake Reservoir as does the Sky Line Ditch; denies that said Lost Lake System is an adjunct to the Sky Line Ditch diversion, and avers that the storage of water therein and diversion of the same therefrom and into Chambers Lake Reservoir and thence into the Cache la Poudre River from the Laramie River water shed is in violation of the terms and conditions of said decrees of June 5th, 1922, and October 9th, 1922, in said Original No. 3, State of Wyoming vs. State of Colorado, et al., and is in violation of the rights of repliant to the use of the waters of the Laramie River and its tributaries as determined by the terms of the said decrees.

IX.

Repliant, for its reply to the new matter alleged in Paragraph Eighth, Part IV thereof, of defendant's answer, de-

nies that the Wilson Supply Ditch, Deadman or Feeder Ditch, the Divide Ditch, the Sand Creek Ditch, and the Deadman Extension Ditch mentioned in Paragraph Fourteen of sub-division five of repliant's amended bill of com-plan-t, are all one and the same ditch; denies that said ditches constitute a portion of the Sand Creek System, and of the Wilson Supply Ditch.

Repliant denies that the Deadman Extension Ditch is merely a section of the Deadman Feeder Ditch, and that said Extension Ditch is now, and/or was at the time of the original construction of said Deadman Feeder Ditch, a por-[fol. 137] tion or part thereof; denies that appropriations of water were made thereby and therefor pursuant to the laws of Colorado as of the date of June 15th, 1899, in the amount of 288 second-feet of water from Sand Creek and from Deadman Creek and tributaries jointly; denies that in the year 1904, pursuant to the laws of Colorado, any proceeding was commenced in the District Court of Larimer County, Colorado, to adjudicate appropriations of water in Water District No. 48 in the State of Colorado under a proceeding designated as Case No. 1885, as a result of which, there was lawfully decreed an appropriation as of June 15th, 1899, in the amount of 288 second-feet from the waters of said Deadman Creek and tributaries and Sand Creek in the State of Colorado, to and for the Wilson Supply Ditch; and further denies that any appropriation in the amount of 288 second-feet of water was made long prior to the year 1902.

Repliant denies that the so-called repairs upon said Wilson Supply Ditch, done in 1929 and 1930, were for the purpose of making the banks of said ditch more secure, and avers that the object and purpose of said work was to increase the carrying capacity of said ditch; that thereby, additional and increased quantities of water could be diverted from the Laramie River water shed into the Cache la Poudre River; denies that since said repair work was done, no greater quantities of water have been taken by reason thereof.

X.

Repliant, for its reply to the new matter alleged in Paragraph Ninth of defendant's answer, denies that any appropriation of water was made from the Deadman Creek and

its tributaries and Sand Creek prior to 1902 and as of the [fol. 138] date of June 15th, 1899; denies that said alleged appropriations of water were perfected as of June 15th, 1899; denies that said Wilson Supply Ditch was constructed as of June 15th, 1899.

XI.

Repliant, for its reply to the new matter alleged in Paragraph Thirteenth of defendant's answer, states that while officials of Colorado advised the State of Wyoming that they were at all times willing and anxious to abide by the terms of the decree of this Honorable Court, said officials of Colorado have constantly refused to observe the terms thereof.

Repliant further avers that unless the control of the diversions from said Laramie River for use in the State of Colorado, in accordance with the terms of the decrees as entered in said former suit, Original No. 3, is enforced by the authority of this Court, repliant will not be able to obtain the protection in nor the full use of that portion of the waters of said stream to which, under said decree, she has been determined to be lawfully entitled.

XII.

Repliant, for its reply to the new matter alleged in Paragraph Fourteenth of said defendant's answer, denies that if the defendant be permitted to divert from the Laramie River in Colorado, through the Laramie-Poudre Tunnel into the Cache la Poudre River annually, a quantity of water in excess of 15,500 acre-feet that the amount of water determined by the decree of this Honorable Court as being available for use in the State of Wyoming will not be reduced; [fol. 139] further denies that Wyoming will not thereby be deprived of the protection to which she is entitled under the terms of said decree in the use of the waters of said river; further denies that the diversion of water by the Wilson Supply Ditch has not been increased in quantity since the date of the entry of the decree of this Honorable Court in said former suit, Original No. 3, State of Wyoming vs. State of Colorado, et al., and further denies that any appropriation of water for said Wilson Supply Ditch vested prior to the year 1902.

XIII

Repliant, for its reply to the new matter alleged in Paragraph Second of defendant's answer relating to repliant's second cause of action, denies that repliant has had free access to make its own measurements of stream flow from the Laramie River and its tributaries in Colorado.

XIV

Repliant, for its reply to the new matter alleged in Paragraph Third of defendant's answer relating to repliant's second cause of action, avers that it is necessary and imperative, to accomplish the full observance of the decrees of this Honorable Court in said former suit, and to fully protect and to make available for use by each of said states, Wyoming and Colorado, the waters of the Laramie River and its tributaries according to their relative rights therein as determined by this Honorable Court, that gauging and measuring devices must be installed, maintained and operated by the Federal Government; that said appropriated waters of said Laramie River and its tributaries must be [fol. 140] administered, divided and controlled by and under the authority and direction of this Honorable Court.

Wherefore, having fully replied to the answer of the State of Colorado, the repliant renews the prayer of its amended original bill of complaint; and further prays that this Honorable Court prohibit and enjoin all diversions from the Laramie River in the State of Colorado other than the recognized appropriations in the decrees of this Honorable Court dated June 5th, 1922, and October 9th, 1922, in Original Case No. 3, State of Wyoming vs. State of Colorado, et al., and May 31st, 1932, in this case.

The State of Wyoming, by James A. Greenwood, Attorney General of the State of Wyoming; Richard J. Jackson, Deputy Attorney General of the State of Wyoming; George W. Ferguson, Assistant Attorney General of the State of Wyoming; R. Dwight Wallace, Assistant Attorney General of the State of Wyoming, Solicitors for Complainant.

[fol. 141] *Duly sworn to by James A. Greenwood. Jurat omitted in printing.*

State of Colorado,
City and County of Denver, ss:

Service of a copy of the Replication of the Complainant, State of Wyoming, to the Answer of the Defendant, State of Colorado, is hereby acknowledged to have been received by me this — day of ——, A. D. 1932.

Clarence L. Ireland, Attorney General of Colorado, and Solicitor for Defendant.

[fol. 142] [File endorsement omitted]

[fol. 143] In Supreme Court of the United States

[Title omitted]

Application for Appointment of Commissioners to Take Testimony—Filed Dec. 8, 1932

Come now the Complainant, State of Wyoming, and Defendant, State of Colorado, in the above entitled cause, by their respective attorneys, and respectfully move this Honorable Court that E. O. Whittington, of Cheyenne, State of Wyoming, and J. Howard Carpenter, of Denver, State of Colorado, be appointed special commissioners to take the testimony in this cause, as per stipulation hereto attached.

Clarence L. Ireland, Attorney General of the State of Colorado, Solicitor of Counsel for Defendant; James A. Greenwood, Attorney General of the State of Wyoming; Richard J. Jackson, Deputy Attorney General; George W. Ferguson, Assistant Attorney General; R. Dwight Wallace, Assistant Attorney General, Solicitors for Complainant.

[fol. 144] In Supreme Court of the United States

[Title omitted]

Stipulation re Appointment of Commissioners—Filed Dec. 8, 1932

Subject to the order and consent of the Court, it is hereby stipulated by and between complainant and defendant, by

their respective attorneys, that E. O. Whittington, of Cheyenne, State of Wyoming, be appointed as special commissioner to take and return the testimony in this cause offered on behalf of the complainant; that J. Howard Carpenter, of Denver, State of Colorado, be appointed as special commissioner to take and return the testimony in this cause offered on behalf of the defendant; that each shall have the power of a Master in Chancery, as provided in the rules of this Court, but said commissioners shall not make any findings of fact or state any conclusions of law.

It is further stipulated that the taking of the testimony on complainant's behalf shall begin on the third day of April, A. D. 1933, at such place as counsel for complainant may designate, ten days' notice thereof being given to counsel for defendant, and shall be concluded within forty days thereafter. The taking of testimony on behalf of the defendant shall commence on or before fifteen days after [fol. 145] the conclusion of the taking of the testimony offered on behalf of complainant, and the taking of testimony by defendant shall be concluded within forty days after the date of the commencement of the taking thereof. The taking of testimony in rebuttal shall commence on or before fifteen days after the conclusion of the taking of the testimony offered on behalf of the defendant. Five days' notice of the place of taking said rebuttal testimony shall be given and shall be concluded within fifteen days thereafter.

The said commissioners shall receive, as agreed by the parties, as their sole compensation for all services and for all testimony taken and transcribed, the sum of twenty cents (20c) per folio for the original transcript, and the further sum of five cents (5c) per folio for each carbon copy thereof, together with actual and necessary traveling expenses incurred in the taking of the testimony, as aforesaid.

Dated this 30th day of November, A. D. 1932.

Clarence L. Ireland, Attorney General of the State of Colorado, Solicitor of Counsel for Defendant; James A. Greenwood, Attorney General of the State of Wyoming; Richard J. Jackson, Deputy Attorney General; George W. Ferguson, Assistant Attorney General; R. Dwight Wallace, Assistant Attorney General, Solicitors for Complainant.

[fols. 146 & 147] SUPREME COURT OF THE UNITED STATES

[Title omitted]

ORDER APPOINTING COMMISSIONERS—Filed Dec. 19, 1932

On consideration of the joint motion and stipulation of counsel for respective parties in this cause for the appointment of Special Commissioners to take and return the testimony in this cause,

It is now here ordered by the Court that E. O. Whittington be, and he is hereby, appointed Special Commissioner to take and return the testimony in this cause offered on behalf of the complainant, and that J. Howard Carpenter be, and he is hereby, appointed Special Commissioner to take and return the testimony in this cause offered on behalf of the defendant, and that each shall have the power of a Master in Chancery, as provided in the Rules of this Court, but said Commissioners shall not make any findings of fact or state any conclusions of law.

It is further ordered that the taking of testimony on behalf of the complainant shall begin on April 3, 1933, at such place as counsel for complainant may designate, ten days' notice thereof to be given to counsel for defendant, and shall be concluded within forty days thereafter; and the taking of the testimony on behalf of the defendant shall commence on or before fifteen days after the conclusion of the testimony offered on behalf of complainant and shall be concluded within forty days thereafter; and the testimony in rebuttal shall be commenced on or before fifteen days after the conclusion of the testimony offered on behalf of [fol. 148] the defendant, five days' notice of the place being given, and shall be concluded within fifteen days thereafter.

It is further ordered, in pursuance of said stipulation, that the said Commissioners shall receive as their sole compensation for all services and for all testimony taken and transcribed, the sum of twenty cents per folio for the original transcript and the further sum of five cents per folio for each carbon copy thereof, together with actual and necessary travelling expenses incurred in the taking of the testimony.

Per Mr. Chief Justice Hughes.

December 19, 1932.

[fol. 149] [File endorsement omitted.]

[fols. 150 & 151] SUPREME COURT OF THE UNITED STATES

[Title omitted]

OATH OF SPECIAL COMMISSIONER CARPENTER—Filed Jan. 3, 1933

I, J. Howard Carpenter, of Denver, State of Colorado, Special Commissioner of the Supreme Court of the United States, appointed by the order of said Court of December 19, 1932, to take and return the testimony offered on behalf of the defendant in the above-entitled cause, do solemnly swear that I will faithfully and impartially discharge and perform all the duties devolving upon me as such Special Commissioner, according to the best of my ability and understanding.

So help me God.

J. Howard Carpenter.

Subscribed and sworn to before me this 30th day of December, 1932.

Leonard H. Rosenfield. (Notary Seal.)

My commission will expire January 31, 1933.

[File endorsement omitted.]

[fols. 152 & 153] SUPREME COURT OF THE UNITED STATES

[Title omitted]

OATH OF SPECIAL COMMISSIONER WHITTINGTON—Filed Jan. 14, 1933

I, E. O. Whittington, of Cheyenne, State of Wyoming, Special Commissioner of the Supreme Court of the United States, appointed by the order of said Court of December 19, 1932, to take and return the testimony offered on behalf of the complainant in the above-entitled cause, do solemnly swear that I will faithfully and impartially discharge and perform all the duties devolving upon me as such Special Commissioner, according to the best of my ability and understanding.

So help me God.

E. O. Whittington.

Subscribed and sworn to before me this 27th day of December, 1932.

M. A. James. (Notary Seal.)

[File endorsement omitted.]

[fol. 154] [File endorsement omitted]

[fols. 155 & 156] In Supreme Court of the United States

[Title omitted]

Motion for Order Setting Cause for Hearing on Merits—Filed March 11, 1935

Now comes the State of Wyoming, Complainant in the above-entitled cause, by its counsellors, and moves the Court that an order be entered setting same for hearing on the merits; and as grounds therefor, states:

That the testimony taken before Commissioners heretofore appointed therein by the Court, has been, together with all exhibits and a narrative statement of the testimony, by said Commissioners, certified to and lodged with the Clerk of this Court; and Complainant files herewith proof of the receipt of a copy of this motion and notice of the filing thereof upon Defendant, State of Colorado.

Ray E. Lee, Attorney General of Wyoming; James A. Greenwood, Special Counsel for Wyoming, Attorneys for Complainant.

[fols. 157 & 158] Supreme Court of the United States

[Title omitted]

Order Granting Motion to Assign Cause for Argument—Filed March 11, 1935

On consideration of the motion to assign this cause for argument on Monday, October 7th next,

It is ordered by this Court that the said motion be, and the same is hereby, granted.

[File endorsement omitted.]

[fol. 159] IN SUPREME COURT OF THE UNITED STATES

[Title omitted]

STIPULATION AS TO PRINTING RECORD—Filed July 25, 1935

It is hereby stipulated and agreed by and between the parties to the above entitled cause that in printing the record in said cause, as is required by the rules of said Court, all statutes introduced in evidence, upon the taking of the testimony, shall be omitted from the printed record, and that such record shall be printed without containing said statutes or any part thereof.

Dated July 12, 1935.

The State of Wyoming, by Ray E. Lee, Attorney General; The State of Colorado, by Paul P. Prosser, Attorney General.

[fol. 160] [File endorsement omitted.]

[fol. 161] IN SUPREME COURT OF THE UNITED STATES

In Equity

THE STATE OF WYOMING, Complainant,

vs.

THE STATE OF COLORADO, Defendant

Narrative Statement of Proceedings

[fols. 162-164] NARRATIVE STATEMENT OF DIRECT EVIDENCE OF COMPLAINANT, PREPARED BY COUNSEL FOR COMPLAINANT STATE OF WYOMING

[fol. 165] DIRECT EVIDENCE IN BEHALF OF COMPLAINANT

BURTON P. FLEMING, a witness in behalf of the complainant:

Direct examination.

By Mr. James A. Greenwood:

(3) I reside at Las Cruces, New Mexico, where I have been engaged since August, 1932, as Dean of Engineering

of the New Mexico State College. I have been registered since about 1924 in the State of Iowa as a professional engineer. I have followed the profession of engineering since 1900, my first work being in the State of Utah. I graduated at the Utah Agricultural College, and, subsequent to my graduation in 1900, I served for about six months as deputy county engineer of Cache County, Utah. Following this service in Utah, I (4) was appointed, about June, 1901, as irrigation assistant at the Wyoming Experiment Station, located at Laramie, Wyoming. I was connected with that institution until the fall of 1904.

I then went to Cornell University, engaging in mechanical engineering, graduating in 1906. After graduating from Cornell University, I served a year in the offices of Irrigation Investigations of the Department of Agriculture. In 1907, for about eight months, I was hydraulic engineer for the California Development Company. I left there to become irrigation engineer of the New Mexico Experiment Station at State College, New Mexico. I left there in 1909 to become head of the department of Mechanical Engineering of the State University of Iowa, and continued, with a few interruptions,—one of them during the war, about eleven months in France—until January of 1929, at which time I became manager of the Elephant Butte Irrigation District at Las Cruces, New Mexico, continuing in that capacity until May of 1932.

[fol. 166] (5) Between May and August of 1932, I was finishing a consulting job in the construction of power plants in Iowa. I was located at Laramie from 1901 until the fall of 1904. While serving in that department, I had occasion to make an investigation of what is known as Sand Creek, originating in Colorado and flowing down through certain parts of Wyoming. This investigation was planned during the summer of 1901 as a cooperative investigation of the office of the Experiment Stations, Irrigation Investigations of the United States Department of Agriculture, and of the Wyoming Experiment Station. The purpose was to determine the use of water on the Laramie Plains, particularly in connection with the irrigation of grass and meadow lands. The object was not to ascertain the feasibility of irrigation, but the amount and use of water.

I am familiar, from my studies, with the course of Sand Creek, and with the points on that creek where a ditch

known as the (6) Highline Ditch, was constructed to divert water to Sheep Creek. It took water from Sand Creek and emptied it into a creek in the Cache la Poudre watershed which, I think, was Sheep Creek. I first became acquainted with the Divide Ditch in the early part of 1902, probably in the spring. I made no observations of the ditch during its construction, it being constructed the first time I saw it, which was in the spring or early part of 1902. The ditch was capable of conveying water between Sand Creek and Sheep Creek, there being a continuous channel to grade between its inlet and its outlet.

Water was first diverted through the Divide Ditch, or Eaton Ditch, on May 9th, 1902. I have determined that date from a report made to the offices of the Irrigation Investigations of our work in that district during the season of 1902, which was published (7) in Bulletin No. 132, Office of Experiment Stations.

When we first began to investigate that situation, we were not aware of the fact that there was a contemplated [fol. 167] diversion of the waters of Sand Creek over into Sheep Creek, but, having started the investigation and having talked with the water users on Sand Creek, we learned that there was such a contemplated diversion, and I remember that the question of whether we should continue that investigation in view of the possibility of that contemplated diversion creating some difficulties between the two states, was discussed with the head of the office, whose headquarters were in Cheyenne; but, in view of the importance of the matter, it was decided to proceed and, if possible, to attempt to secure information on the amount of water diverted from Sand Creek during that season. This inquiry was pursued during the summer of 1902.

Current meter measurements, the number of which I cannot now recall, but a sufficient number to establish rating curves, were made for the stream; and an observer, whose name I cannot now recall, read the gauges at the points where measurements were made.

I cannot now recall that there was any other ditch in 1902 which connected Sand Creek with Sheep Creek, or diverted water out of Sand Creek. I cannot recall that I made an inspection of the (8) area above the diversion of the Divide Ditch on Sand Creek. There were rumors,

however, that work was contemplated above that point, but nothing below.

I have a very distinct recollection of having made a trip in 1903 to the upper reaches of Sand Creek and Deadman Creek. I have no direct recollection from my visit to Deadman Creek in 1903 of directions. There was a group of cabins at the time I was there, one of which was a mess hall or mess cabin. This group of cabins was in a little mountain park, and as one looked down the stream on the right, —I cannot now recall what direction that would be—there was a ditch built through this mountain park and meandering off toward the right, which ended ultimately in Sand Creek. I haven't now any recollection of the condition of [fol. 168] that ditch, or whether it was a ditch which was wholly completed; but I do recall that it was in an advance state of completion.

(9) On the left and extending off out through the meadows and through the timber, was a plowed furrow, which was evidently the site of other ditches extending off to the left. These ditches extending off to the left, did not appear to be anything more than a plowed furrow at that time. My recollection is that they were still working on the ditch extending to the right from the cabins toward Sand Creek, but were about ready to leave—it was late in the season.

I met the construction foreman, whose name was Pixler, and who made quite an impression on me. My recollection is that they were about to leave and there was only a small crew there at the time. I cannot recall whether they were then working on the ditch, but presumably they were. I recall there was no headgate at what was presumably Deadman Creek. I am pretty positive that at that time there was some water passing over the lower end of this completed section into the upper end of Sand Creek, but whether it was entirely completed and the channel was continuous, I cannot now recall.

The ditch about which we are speaking, Deadman Ditch, or Wilson Supply Ditch, is described in Subdivision 5, paragraph 14, of the Complainant's Bill of Complaint.

(10) (Complainant's Exhibit No. 1 marked for identification.)

(Photostatic copy of pages 101 to 123, including map preceding page 101, 1903 Bulletin, published by the United

States Department of Agriculture in the Offices of Experiment Stations.)

[fol. 169] I recognize Complainant's Exhibit No. 1 pages *101 to 123, including the map preceding page 101, as a report* I wrote of investigations that we made on Sand Creek in the year 1902, which is in the 1903 Bulletin published by the United States Department of Agriculture in the Offices of Experiment Stations. This report states accurately the data of the observations which I made at that time.

My understanding is that Deadman Creek is a tributary of the Laramie River. From my study in 1902 and 1903 of the area where the Divide and Deadman Ditches are constructed, it is my judgment it would not have been possible to divert water from Deadman (11) Creek through Sand Creek over into Sheep Creek prior to 1902, because there was no way of getting it there. No water could have been diverted from Sand Creek proper, or from Deadman Creek through Sand Creek to Sheep Creek prior to May 9th, 1902. There were several cabins at the time of my visit in 1903 in the vicinity of Deadman Creek where this construction was going on. I remember particularly of one in which we ate dinner. How many there were, I have no recollection at this time. These cabins were being used by the construction crew. I ate a meal there with the crew at the time of my 1903 visit. I have a very distinct recollection of a visit made in September, probably in the early part of September, 1903.

I was a graduate engineer at the time I was engaged at Laramie and took up work there with the Extension Department. I graduated in 1900 from Utah Agricultural College in civil (12) engineering.

The bulletin, Complainant's Exhibit No. 1, was prepared as a report of an investigation conducted jointly by the Wyoming Agricultural Experiment Station at Laramie and the offices of Irrigation Investigations, offices of Experiment Stations, of the United States Department of Agriculture.

(Complainant's Exhibit No. 1 offered in evidence.)

[fol. 170] At the time I observed the Divide Ditch on May 9th, it was possibly four feet wide on the bottom. I made photographs of the ditch at that time.

Cross-examination.

By Mr. C. D. Todd:

The probability is that I first became acquainted with Sand Creek in the fall of 1901. Prior to that time, I had no knowledge of it. I have no knowledge or recollection of having (13) seen the Divide Ditch in 1901. My first acquaintance with that ditch would be in the spring of 1902. The ditch was then constructed and water, I think, was first admitted to it in May of 1902.

We had made arrangements with someone, whose name I cannot now recall, to read gauges on that stream, and I have no recollection at the present time that I was there when water first went through that ditch from Sand Creek, but the record was as of May 9th, 1902, for the first water which was diverted from Sand Creek.

In order to make diversions from Sand Creek, there was a wooden gate in the rock embankment across Sand Creek that was sufficient to divert water from Sand Creek to Sheep Creek, and a similar gate at the head of this ditch. Water was being diverted there in the summer of 1902. The quantity of water diverted in the (14) year 1902 is shown on page 119 of Complainant's Exhibit No. 1, which is a record of daily gauge heights and flows. The table on page 119, Complainant's Exhibit No. 1, purports to give the daily average discharge in cubic feet per second, and the discharge in acre feet per day through the Divide Ditch for the months of May, June and July. The record of diversion of water from Sand Creek into Sheep Creek in 1902 begins on the 9th of May, and it shows that some water, in varying quantities, was carried by the ditch from the 9th of May until the end of May; that some water was carried every day during the month of June, and that during the month [fol. 171] of July, there were times when practically no water was being carried, and only small amounts at any time.

In July, the maximum discharge in cubic feet per second is shown as being only 1.9, and the minimum, of course, is zero. The diversion was only for a limited number of days —probably not more than half of the month. During June, there was a more continuous discharge, there being some discharge the entire month. The first of June shows the maximum or greater discharge. On June 1st, the record

shows 22.3 cubic feet per second discharge, (15) and on June 30th, 1.59 cubic feet per second discharge. After June 11th, the amount of discharge decreased continuously throughout the rest of the month.

The discharge during the month of May was appreciably greater than the discharge in June. The maximum discharge was 35.8 second feet on the 15th day of May, and the aggregate discharge in acre feet in May, as shown by the record, is 976.12 acre feet. The total acre feet discharge in June was 394.32; and in July, 23 acre feet. The flow in twenty-two days of May was about three times as much as all of June, and July was very small. There was some variation of flow from day to day. I think our readings were made probably not more than twice a day, which, of course, would not show any diurnal variation during the period between the readings. Our records were not made by a continuous gauge height register. As (16) compiled here, I gave the average of the two-a-day readings—that is, I struck an average.

I have no definite knowledge of the elevation of the mountain territory where the ditch and streams are, but suppose it is certainly above eight thousand feet. I presume at that elevation, the snow melts during the day and then the streams check up by freezing during the night, making quite a variation in the diurnal flow.

[fol. 172] The table shows the total diversion by Wilson Supply Ditch from Sand Creek over into Sheep Creek during the season of 1902. The acre feet diverted from Sand Creek into Sheep Creek could be converted into cubic feet. An acre foot is 43,560 cubic feet. In my tables, I have used acre feet and not cubic feet, or millions of cubic feet.

I understand, when you refer to the "Wilson Supply Ditch," that you mean that which we have heretofore been calling the "Divide Ditch."

"Q. Yes, and for the benefit of the record I will say that the Wilson Supply Ditch, as mentioned in the (17) modified decree of the Supreme Court, and its opinions, and the Sand Creek Ditch and the Divide Ditch and the Deadman Ditch, are all one and the same ditch, and I believe you give it still another name; what was that?

"A. I called it by that name which was given to it by the ranchers at the time, and it was called the Highline Ditch."

Mr. Greenwood: We want to enter an objection to counsel's statement as to what constitutes the Wilson Supply Ditch, as not being in accordance with what we understand the record to be as to that ditch.

The canon of Sand Creek is very precipitous—I imagine the slope must be one hundred feet or more per mile—and the side slopes, as I recall them, were quite steep. The material, for the most part probably, is disintegrated granite. This ditch, and I am speaking now from recollection of nearly thirty years, at various places, encountered some very heavy rock work and was constructed along the steep side hill, following the contour; and my recollection is that at one place, there was a tunnel, and at another place, there was a flume. I should imagine that the construction of this ditch was a very difficult undertaking and would take [fol. 173] a considerable time to construct it. I should imagine that they would (18) have considerable difficulty in constructing ditches at that elevation and under those circumstances during the winter, but just how long might be their period of construction, I have no knowledge. I did not see the ditch under construction, but I am familiar with construction of ditches through similar territory.

I remember that the ditch which connects with Sand Creek and extends up to Deadman and beyond, was, for the most part, through a rather flatter country—a park country for the most part. I think there were no precipitous slopes, but of that, I am not now certain. I cannot definitely recall that after it crosses the little flat where it connects with Sand Creek, that it follows up the mountain side on some grade for some distance, but I presume it must to get over the hog-back.

During that summer, I saw a ditch that was constructed and discharging water from Deadman down into Sand Creek. The discharge into Sand Creek necessarily followed the channel of Sand Creek, which would be used as a ditch, to the dam where they diverted the water over into Sheep Creek.

(19) I am unable to state the total amount of water diverted in 1903 by the Divide Ditch. I suppose I must have made some measurements on that Divide Ditch in 1903, but I have no record of them now. I made no measurements in 1904, or any subsequent year. I can give you no information at the present time on the flow in 1903 through

the Wilson Supply Ditch because the records are probably no longer extant.

I saw some cabins or a ditch camp at the site of these ditches which were presumably intended to divert water from Deadman or other creeks over into Sand Creek. They were not at the junction of that ditch with Sand Creek. My recollection is that they were in this little mountain park through which Deadman Creek runs. It [fol. 174] was south of the discharge into Sand Creek and must have been at the upper end of that ditch.

(20) My only definite recollection of the ditch camp is of the mess camp or hut where I obtained my dinner. I have no certain knowledge as to how long they had been there. I have not been there since 1903. It would be necessary, in the construction of a ditch in that mountainous region, for such a camp. I can see no special reason for keeping it up for an indefinite period of years after the work was constructed, unless it was an operating crew. I suppose a ditch of that character would require more or less work to be done on it from year to year, and a camp would be necessary in that remote region for the use of the teams and men engaged in that work. That kind of a ditch would need repairs from year to year, presumably.

I suppose it would require some period of time prior to the actual diversion of water to construct a ditch of the character (21) of the ditch from Deadman into Sand Creek, and Sand Creek into Sheep Creek. The diversion from Sand Creek into Sheep Creek, as I remember, is the re-diversion from Sand Creek of the water that was discharged into Sand Creek that came down that ditch where I saw the cabins. I think this ditch would also require a considerable length of time for construction before water could be diverted.

Redirect examination.

By Mr. James A. Greenwood:

(22) I think the amount of water which I observed in the ditch from the head waters of Deadman Creek to Sand Creek in 1903, when I was there, was so small that it was not considered feasible to measure it. That is my recollection of the matter at the present time.

At that time I was there and familiar with the situation, there was across Sand Creek, an embankment in which

there was a wooden gate, probably with flash boards which [fol. 175] could be added to or removed as the occasion might demand; and adjacent to it and at the head of the Divide Ditch, was a gate which could be raised and lowered; and then there was a continuous channel, probably to grade, between that point and the point where this ditch emptied into Sheep Creek, or to the end of the ditch. In other words, as well as the diversion works, they had a means or course for the water to follow.

(23) I am the same Mr. Fleming who was a witness and gave testimony in a case in 1904, although I do not remember now the exact title of the case.

Recross-examination.

By Mr. C. D. Todd:

I was over the Sand Creek system and up at the point of discharge of Deadman Feeder into Sand Creek in September, 1903. There was some water there, unquestionably, but I have no definite recollection now of whether we made a measurement or thought there was so little we could not, but I am definite there was some water there. I do not recall what sort of season 1903 was, and I would hesitate to express an opinion whether there would be available water for the ditch at that season of the year.

My table in Exhibit No. 1 shows that the entire discharge, not only from Sand Creek, but from the streams and ditches that discharge into it, was never as great as two feet in July, 1902. The table shows that after the middle of June, the water is very (24) limited in quantity. This would not necessarily be true in 1903. My recollection is that 1902 was an exceptionally dry year. The period of run and melting snow off of that water-shed might be relatively, approximately the same in the same month every year, but not absolutely. I should imagine that there might be some flow in all of the months of the year, even those late in the summer of a year of good rainfall or good snowfall.

[fol. 176] I cannot now recall to my own knowledge, when I was there in September, 1903, whether that was the period when there was a heavy run of water in any of the streams of that area.

I think the map shown on the page preceding 101 in Exhibit No. 1, and attached thereto, was prepared in the offices of the Irrigation Investigations. It is presumably a correct map of the locality and streams and ditches.

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(25) A. C. WORSTER, a witness in behalf of the complainant:

Direct examination.

By Mr. James A. Greenwood:

I have resided about six miles south and west of Tie Siding for about four years. Prior to living at that place, I lived on Sheep Creek in Colorado. I first resided on Sheep Creek, as near as I can figure it out, in 1902. My business at that time was ranching. I came there with my father. My ranch was located on Sheep Creek in Section 4, Township 11, Range 74, if I am not mistaken. There is two places on Sheep Creek right there together in Section 4.

(26) I went to Sheep Creek in 1892 and lived there twenty-four years. During that time, I was off of there the first time in 1894, when I went up to Fox Park. How I know it was 1894, I was married that year. I worked at the sawmill that summer and then went back onto Trail Creek that fall, in 1894.

Trail Creek is not a tributary of Sheep Creek. It is a creek north of Sheep Creek. My ranch was not on Trail Creek; that was where I went and where I was married. I went down there and worked with my wife's folks and during the winter, I moved from there to George Creek, returning to Sheep Creek in the spring of 1895.

(27) I know where Sand Creek is located and have been in the vicinity of Sand Creek or in that territory often. I was [fol. 177] there first—we were snowed in in 1893 and 1894. There came a big snow storm on the 11th of October. I have been in this territory where Sand Creek is located numerous times after that. I rode in there for my livestock, horses and cattle. I don't suppose there was a year I wasn't in that vicinity.

I was up at Sand Creek or upon Sand Creek a year ago this last summer. I know where the headgate of the ditch

that has been spoken of or called the Eaton Ditch or Divide Ditch is on Sand Creek, and am familiar with the course of that ditch. It runs from (28) the headgate where it intersects Sand Creek, across the divide into Sheep Creek. I cannot remember when I first observed or knew there was any diversion works, headgate or ditch connecting Sand Creek with Sheep Creek. I was in that vicinity and upon the creek in 1902.

I could not state whether in 1902 there was any water being diverted from Sand Creek into Sheep Creek by the Divide or Eaton Ditch. 1902 is the year I took Mr. Pixler up on the Deadman. Prior to going up on Deadman, I did not observe any men working on the Divide Ditch. I don't think there was any men there. I could not say whether they had quit working on the ditch at that time or not. The (29) only way I could fix the time, as to whether it was early or late spring—I had a daughter born, Elsie, on the 22nd day of June in 1901, five days later, her mother died, and I went to Washington that September, and I came back the next spring, which would be 1902; and Pixler said to me, "You are acquainted with that country, would you mind showing me the way to Deadman?"—meaning the country up in the vicinity of Deadman Creek.

I showed Mr. Pixler, in the summer of 1902, the way through to Deadman Creek. Mr. Pixler accompanied me, and his little bunch of men followed me in. There were no [fol. 178] cabins at Deadman Creek when we went up through that country. They were put there later. I started to put them in there and helped build them, as near as I can figure it out, in 1902.

(30) When I took Mr. Pixler up over the route to Deadman Creek in 1902, there was no ditch constructed from the headwaters of Deadman Creek near the place where the cabins were constructed. I am certain there was no ditch started, because Pixler and I walked down and found the marks on the trees where it was to start. That was the condition when I took him in there.

I was in that vicinity in 1903. I took beef up there to Deadman and sold it to the Eaton camp. Bill Pixler was foreman at that time. Bill Pixler, the boss, and the crew were at the camp (31) in 1903, building a ditch from the location of the cabins toward Sand Creek.

I am sixty-two years old now.

Cross-examination.

By Mr. C. D. Todd:

I did not sell some land to B. H. Eaton for a reservoir on Sheep Creek. I had Section 5, a railroad section, leased at that time and in some way Bruce got the section away from me. They took it away from me and Bruce got it. That was where I resided, on the east side of the range. I did sell Mr. Eaton a right-of-way through my place for the Worster reservoir, on the channel of Sheep Creek. It was named after me; I was the first one that started it.

(32) I sold the right-of-way to Mr. Bruce Eaton, himself, but do not know to what company he sold the reservoir. I knew the Divide Canal and Reservoir Company only as the "Eaton" or "Eaton Corporation," and I know that that corporation or Eaton built the Worster Reservoir.

I ran cattle through that country for many years. It was just open range at that time. As near as I can figure it [fol. 179] out, the Wilson Supply Ditch was constructed in the fall of 1901 and in the spring of 1902. It was built through a rough and very rocky country.

Mr. Greenwood: We are not going to agree as to what the Wilson Supply Ditch really constitutes. Perhaps you will confuse the witness a little. Can you give the section numbers of it? As I understand it, the Wilson Supply Ditch is the entire system, and we feel it is a different proposition, so if you refer to the Divide section or Deadman section, please advise the witness (33) so you will not confuse him on that.

The ditch was rocks from start to finish—granite—but I do not know how long it is through there. I never seen it measured. I am familiar with the part sometimes called the "Divide Ditch" or "Sand Creek Ditch" that diverts water from Sand Creek into Sheep Creek. I know every bit of it; I have been over every foot of it.

As to finishing the ditch in 1901, I went up there—that is the fall before I went to Washington, and they was working on that ditch then, doing something with the tunnel that fall; and I have an idea, as near as I can figure out, that was the year they finished it.

I am familiar with another ditch up Sand Creek some four or five miles, called the Deadman Ditch. I was never acquainted with Phillip Wilson, but knew R. Q. Tenney well. He surveyed my (34) place and was going to make a reservoir out of it. He stayed at my place. I don't know as I ever met Wilson.

I don't remember Mr. Tenney making a survey of a ditch for Mr. Wilson from Sand Creek Ditch to Deadman Creek. That was done before I was in there.

[fol. 180] I could not say the year that they put water through the ditch from Deadman Creek to Sand Creek, but I took Mr. Pixler in there the year that they started it; I could not tell you the year it was finished. There was no ditch there the year Pixler went up in there, the same time that I did. We went to Deadman camp. That is where I took Mr. Pixler. I blazed a trail through there. He wanted me to show him the road through there because I knew that country from the old sawmill—that is, the other side of Sand Creek, the Divide Ditch—it must be ten miles up there. I should judge that it is ten miles from the head of the Divide Ditch to Deadman Ditch.

(35) I could not tell you how many times Mr. Pixler was up there working on any ditches, but he was there more than one year. It took more than one year to build all of those ditches. If I have got it figured out right, I took Mr. Tenney and Mr. Eaton in there in 1897 or 1898, which was the beginning of the Divide Ditch from Sand Creek to Sheep Creek, which is one of the ditches.

When you go up from the Divide Ditch, you go to the Deadman Ditch. It swings around and comes in to the head of Sand Creek and comes down Sand Creek, and through this Divide Ditch. I could not tell you whether the Deadman Ditch from the point where it joins Sand Creek, extends up along the mountains a considerable distance. I was never there to see it after they put the water through into Sand Creek from Deadman. There was no ditches from Sand Creek up the mountain in a southerly direction to Deadman Creek and other tributaries of the Laramie River until they built (36) the Deadman Ditch; that is all of the ditches in that country.

As near as I can remember, I took Tenney on the Divide Ditch in 1897 or 1898. I never took him up to Deadman; he had been up there. I am pretty sure that he surveyed a ditch up there—the Deadman Ditch.

[fol. 181] I was well acquainted with Mr. Tenney, but could not tell you what name he gave the ditch he was surveying and constructing. I cannot remember whether he said it was the Wilson Supply Ditch; it always went by the name of Eaton Ditch—that is, to me. I do not know for others; but to me, it has always been the Eaton Ditch.

(37) I have seen the Divide Ditch several times since 1902 and 1903. I have been up to the Deadman Ditch once or twice since. I hauled beef in there in 1903 and, I think, 1904, after I was married. I was married again in 1904, and the way I have got it figured out, I took beef up there to them in 1903 and 1904. I could not tell you the sections.

I have been over to the Columbine Ditch, or Columbine camp, which is farther up that ditch. I could not say if there is other camps between the Columbine and the Deadman camp. To tell the straight of it, I do not think there is any camp in between there—not that I ever seen.

I could not tell you when I took Mr. Pixler up to work on this ditch, whether the right-of-way had been cleared for construction work, but I do not think it had. It could not have been, because they could not get in there by wagon until I took them in, the way I figured it out. I did not go along the ditch—I just went to the head of the ditch, as I told you, and that is where the ditch started. I never followed the ditch around the mountains. There is no mountains there. It is more gradually sloping; it is forest—right through the trees and timber. I never went along the Deadman Ditch.

(38) Redirect examination.

By Mr. James A. Greenwood:

The survey of the Divide Ditch was commenced in 1897. That is when I took them in there. Although I had never been along Deadman Ditch, I was in that vicinity where the cabins are located, and if there had been a ditch leading [fol. 182] over there from Sand Creek, I sure would have seen it. There was no ditch there in 1902. I could not say what ditch may have been constructed there since I took Mr. Pixler in in 1902. There was a construction crew of men up there at the cabins in 1903, when I was taking beef in there. They were working, building the ditch.

(39) A. H. WILLIAMS, a witness in behalf of the complainant:

Direct examination.

By Mr. James A. Greenwood:

I am a rancher and have resided at Tie Siding practically all my life. I was raised there and left there and went out and scouted around some about 1900—it may have been a year or two earlier than that.

I am acquainted with the country around Sand Creek and have been upon it and know where the creek course is. I was first there around 1900 when I was just ranching and riding around. (40 I was living in that vicinity, staying at the Fred Collins' ranch on Sand Creek, where I remained off and on for quite a while—two or three years. You asked what I was doing in there—I worked first for the Ernest Land & Cattle Company when I first went in there, which was about 1900. I was staying on the Payne ranch that Ernest had in the summer, and was riding on the ranch.

In the course of my duties as a rider, I traversed the Sand Creek country, and worked for him the summer of 1900. (41) From there, I went to Collinses. I worked some for Collins, and then I gathered horses a season with headquarters at the Collins ranch.

I heard the testimony here regarding the Divide or Eaton Ditch, leading from Sand Creek to Sheep Creek, and know where that ditch is located. I have been to the point where the ditch connects to Sand Creek and am familiar with the course of the ditch from there to Sheep Creek. I first ob- [fol. 183] served that ditch in February, 1902, when I went up there to go to work to help build the ditch. (42) Bill Pixler was in charge of the work and had a crew of nine or ten men. I was employed there in February. They were able to get in there to work in February, although there was snow to interfere with the work. I would say I worked there about a month, but do not recall the date I left.

As I remember, when I left, the ditch was not constructed or completed to such a condition as to be capable of conveying water from Sand Creek to Sheep Creek. They were building the ditch when I left there and it was not completed. Up to that time, there had not been any water conveyed through the ditch from (43) Sand Creek to Sheep

Creek. I recall there were portions of it where it was not constructed to a sufficient extent to control a small stream of water, and these portions were still to be constructed when I left there. From my observations and knowledge, it would not have been possible to take Sand Creek water or Deadman Creek water out of Sand Creek, through the Divide Ditch over into Sheep Creek prior to 1902. There was no other ditch then, nor is there today, any other ditch out of Sand Creek that can convey water to Sheep Creek. It is the only ditch I know of. I have been over that territory.

Cross-examination.

By Mr. C. D. Todd:

I worked on the Divide Ditch in February, 1902. (44) The ditch was built through a pretty rough country, which was a rather difficult place to build a ditch. It is part open ditch and part tunnel, and would take a fairly, considerable length of time to construct. Ordinarily, you can work up there the year around. The snow does not get so very deep. It piles up in pretty deep drifts. In some places it is pretty deep, but would not interfere on rock work.
[fol. 184] I could not state whether the ditch was completed so they diverted water in May and the summer of 1902. As I remember it, there was one knoll, a rock pile they had to shoot off right at the headgates in order to complete the ditch. All (45) they had to do was to shoot out the rock work; otherwise, the ditch was completed, ready to run the water.

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(46) Edward Lundquist, a witness in behalf of the complainant:

Direct examination.

By Mr. James A. Greenwood:

At the present time, I am living at Tie Siding and am engaged in trucking. I used to be a rancher on Sand Creek where I had a ranch. I first became engaged in ranching on Sand Creek in 1882 and lived there forty-eight years. I am familiar with the Sand Creek country and have trav-

ersed it more or less. My ranch was directly on the creek and a part of it is tillable (47) farm land under irrigation. I irrigated around three hundred acres from water out of Sand Creek.

I think I first irrigated a part of my ranch on Sand Creek by the use of Sand Creek water in 1885, by a ditch which I took out. Subsequent to that time, I took out the Lundquist No. 1 ditch for the irrigation of additional lands on my ranch. The ditch was taken out and completed in 1900 for the purpose of diverting water for irrigation.

(48) I recall at the time I was constructing Lundquist Ditch No. 1, there was a ditch being constructed in Colorado, I suppose, to take the head of the stream. At the time we built ours, we did not know whether we were going to have water or not, but we hurried the completion and had it recorded as soon as possible. We called the ditch that was being constructed in Colorado, the Eaton Ditch, and later on, the Divide Ditch. I know where that ditch is located and have been there a number of times. I first [fol. 185] saw it in the spring of 1901. I was up there when they were constructing it.

I was there and observed and knew they were working in 1901 and 1902. There was no water diverted from Sand Creek by this Divide Ditch into Sheep Creek in 1901. There may have been (49) some water diverted by that means in 1902—I could not positively say to that.

I remained on my ranch on Sand Creek from 1902 until a year ago last November. The diversion by the Divide Ditch affected my ability to get water from Sand Creek. Practically every year, there was a shortage of water, and our ditch, being one of the latest ditches, would usually be closed down by the water commissioners of Wyoming due to the fact that the water was being diverted to the other ditch in Colorado. I cannot recall any interference with our attempted irrigation prior to 1902. Up to that time, the entire flow of Sand Creek came down to us. There never has been, nor is there now, any other ditch that connects Sand Creek with Sheep Creek. I would say positively that there was no diversion of water from Sand Creek to Sheep Creek by the Divide Ditch in 1901, or in the spring of 1902; and nothing prior (50) to 1902.

My age is fifty-one. I have been up in the territory of the headwaters of Deadman Creek, but not prior to 1902.

I believe that 1908 was the first time that I was there. From my knowledge of the conditions of the Divide Ditch, it would not have been possible to have diverted water from Sand Creek proper, or any contributions of water from Deadman to Sand Creek farther up the stream by means of the Divide Ditch prior to 1902.

Mr. Howell: We object to that as leading the witness. We submit that the questions ought to be asked so that he can answer, instead of counsel.

[fol. 186] Cross-examination.

By Mr. C. D. Todd:

My ranch on Sand Creek is about five miles north of (51) the Colorado state line. About three hundred acres of my land has been irrigated by the Konold Ditch and Lundquist No. 1. I do not know just exactly how many acres of my land is irrigated under the Lundquist Ditch No. 1. There is a small amount; there is more irrigated than really was recorded. I believe my permit is on record for something like thirty-eight or forty acres. I could not say whether it is twenty-six acres. It is not a great amount, I know. I could not just exactly say how much water I claim for the Lundquist Ditch No. 1, in cubic feet per second of time. I do not remember at this time; it is of record though. I claimed sufficient water to irrigate what we had; sometimes we did not have sufficient water, and sometimes, had quite a lot, and used it accordingly.

The stream is very variable. There are periods in the spring of the year when there is an abundance of water for everybody, but not of late years. I do not know how much my permit calls for on that ditch. I could not say right now. It may be 37/100ths (52) of a foot. The date of it is 1900.

My other ditch is the Konold Ditch. The Konold Ditch was owned by my father and the Konold Brothers, and later on, by John Goetz. I do not recall the exact acres of land that the permit called for; some is on Section 30, and some is on Section 25. I think it is something around seventy-eight acres. I do not recollect how many cubic feet per second my permit allows me to use. In fact, I do not own the property at this time. I owned it for several

years—twenty years—but parted with it a year ago last November. I ought to know, after using it for twenty years, how much water I was allowed to take, but I do not. I know I used water every year when there was water to use.

[fol. 187] I would not say whether my permit provides for (53) 1.11 cubic feet of water per second from the Konold Ditch. I haven't the record with me and I could not say. I expect it was about the amount of water I got. There was no weirs on the ditch, no way of measuring it. I just helped myself when there was water—not at all times of the year, because there wasn't water at all times. There were times when Sand Creek went completely dry in late summer.

Sand Creek furnishes water through May, June, July and part of August. I do not believe it ever did dry up in July, but it did about the middle of August, and after that, there was no water in Sand Creek for anybody.

The crops irrigated on the ranch were mostly hay, some alfalfa and small grain and potatoes. We turn the water on to irrigate native hay around May, as soon as the water starts and the snow is out so you can run water in the ditches. We let it run until the (54) latter part of July —until we hay. That is the customary way of irrigating native hay.

We never have measured the water in cubic feet; the water commissioners may once in a while do it. We usually experience interference with our ditches on Sand Creek around the first of June. There are other tributaries of Sand Creek that come in below the dam of the Divide Ditch. There is one branch of Sand Creek comes out of Sand Creek Pass, and Running Water Creek, and some other small streams that I do not believe have any name. None of them are very large and do not furnish any considerable amount of water. There are appropriations out of some of these creeks.

It is around thirteen miles from the Divide Dam down to the headgates of the ditches on my ranches. There are about three return streams or tributaries of any size in that thirteen miles. (55) There may be some little draws in addition to the three named that run small streams of water, [fol. 188] but nothing of any great amount. I think that one stream is about all that comes into Sand Creek in Colorado. That is the one out of Sand Creek Pass. There are others that come out of Colorado, but enter Sand Creek

in Wyoming. They originate in Colorado, but do not get into Sand Creek until they cross the state line. There are none of them on Shell Creek, which is farther west and eventually empties into Sand Creek away down below, about four miles below my place.

Sand Creek has very little water in it after some period in July, which varies from year to year. My ditches were not the oldest ditches on the creek; there was other ditches come in ahead of mine, and some of them were larger appropriations. If (56) there was sufficient water, I got my appropriation, but they cut off the main stream and diverted the water completely, letting none down that channel. My water supply was diminished around the first of June, varying from year to year, depending upon the amount of snow that lay in Sand Creek Pass and the other mountains and the hills; but all of the water was cut off by this ditch.

Our water supply was diminished by the Sand Creek diversion for several years after that ditch was cut in. My recollection of the exact years of shortage is that in 1902, there was a water shortage—it wasn't felt so much that time as it was in recent years, due to the fact they did not have a very substantial ditch and lots of water was lost in seepage and it went back into Sand Creek; but later on, it was cemented and a water-tight headgate put in. I suffered a diminution of my water supply every year during the last four years and there has been a shortage practically every year for the last twelve years. Practically during all the (57) irrigation season, there wasn't sufficient water for everybody. As a general thing, and the average season, during the early part of the season, there was sufficient water while the foothill water and the water of the low [fol. 189] hills and mountains was coming out. But as soon as we had to depend on the late water, it was cut off by this ditch; there was no water coming from the high altitude.

Sand Creek comes out of a high altitude. At the upper end, it has rather heavy timber, and rather high. It is a thousand feet or more higher than the other ditches I have mentioned. I do not know the exact elevation.

I have been to the Deadman Ditch and know the country; I am not particularly familiar with it. In a way, it gets its water supply from a higher point than Sand Creek. The upper end of Sand Creek is practically on the same elevation, the same water-shed and the same territory. There

is very little difference in the elevation of the source of Deadman Creek and Sand Creek. It is comparatively level country—a kind of park country and high, and these heads are all practically in the same district and about the same elevation.

Redirect examination.

By Mr. James A. Greenwood:

(58) As to diverting and taking more water than our appropriation, would say that we turned in water in the ditch sufficient to cover the land and let it run back in the creek. The commissioner did not, as a general thing, regulate our diversions as to what we were entitled to. They did regulate our diversions in certain years.

Our rights were not the earliest rights on the stream. There were several, four or five, prior to the Konold Ditch. The closing of the Sand Creek diversion works or the Divide Ditch reduced the general flow for late water that would pass on below. You might say, completely, in the average year. The diversion works they have in the creek are capable of shutting off all the water, and that has been the practice in recent years. I have been there several times with a complete shutdown, and even with gunny sacks in it to shut off the seepage.

[fol. 190] We do not feel the effects of this situation until the first of June. The diversion of the Divide Ditch, from the first of June, interfered with our ability to get sufficient water below. Lundquist No. 1 Ditch was really the first one to feel the (59) effects of it—it was the youngest ditch on the creek in Wyoming. With this diversion works from Sand Creek and Sheep Creek in operation, it was not possible at all times to get at the headgates of our ditches, sufficient water to irrigate or fill our appropriations. Sometimes it was possible when there was an abundance of moisture and snow. It would all depend on whether there was moisture and snow below the diversion works. With snow below their ditch, we would have a larger supply of water; but if there was a shortage in the foothills, we would not.

I have been living on Sand Creek for a number of years, where I was ranching, and am acquainted with the conditions up and down the creek at other ranches. As a general thing, the other water users experienced a shortage at times

during the year because the water was being diverted through the Divide Ditch.

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(60) WILLIAM A. WURL, a witness in behalf of complainant:

Direct examination.

By Mr. James A. Greenwood:

I reside in Laramie. I was born and raised on Sand Creek, where I resided for forty-four years. I moved out of there in 1929. I am forty-seven years old. My business while living on Sand Creek was ranching. I lived there with my parents during my boyhood, and continued in the ranching business for myself in (61) the Sand Creek country. My ranch was stock and cattle. I did not do any farming to speak of, but irrigated hay meadows.

In my ranching operations, I rode more or less over that territory in looking after my stock, and have knowledge of the character of that country. It is rough, hilly, pretty near [fol. 191] the mountains. I am familiar with the course of Sand Creek and have been up and down it many times. I know there is an irrigation ditch or diversion ditch from Sand Creek to Sheep Creek. Have been at the point where this ditch intersects Sand Creek and know where that ditch is located.

(62) We always called that ditch the Eaton Ditch. Have heard it called the Divide Ditch, too; it is Eaton Ditch and Divide Ditch. I have followed the course of that ditch and know where it goes into Sheep Creek. I know about when that ditch was constructed. They was working in 1901 and 1902, and in 1903 was the first amount of water that flowed through that, that done any washing out.

I mean by "washing out" that the ditch made a wash-out at the lower end—cut out the road; cut out the road where it crossed the ditch. This road was a wood road used for hauling out (63) wood. I was accustomed to using that road and used it prior to and including 1902. In 1903, I did not go over it, it was washed out by water from this ditch. I used the road in 1902. 1903 was the first time there had

been sufficient water go through that ditch to interfere with our use of the road.

I am familiar with the country where the ditch is constructed. It is rough, rocky and steep. It is on a steep hillside, rocky and steep, and is about a mile long. I saw the ditch last fall. (64) The ditch, at the headgates, is about six to eight feet wide on the bottom. It was constructed at the lower end by turning the water loose out of the ditch down to Sheep Creek. The part of the ditch where the road crossed, was between the two. They turned it loose on the top of the hill, and it run its own course to Sheep Creek.

I never saw any water diverted from Sand Creek into Sheep Creek by the Divide Ditch prior to 1902. As far as I know, there was none.

[fol. 192] Cross-examination.

By Mr. C. D. Todd:

They were working, constructing the ditch in 1901 and the early part of 1902. I didn't see any water running in 1902. I was up there. There wasn't enough water at the lower end of the ditch to make this wash-out. The wash-out to which I refer is at the end of the ditch where they stopped the ditch on (65) the hill, and it cut a channel from there down into Sheep Creek, across the wood road. It was close to the junction or the outlet of the ditch into Sheep Creek.

The water ran down from the end of the ditch in a gully across the road into Sheep Creek. A bridge was put in after this ditch was washed out. The use of the ditch has deepened it at the bridge. There was no bridge in there to start with before this ditch was built. The road is old, and after the water cut and made the ditch too deep, they put a bridge over it, which is there now.

In 1902, the water did not cut so bad but what you could get across; but in 1903, it cut deeper. It continued to (66) cut more or less from the end of the ditch down into Sheep Creek, and is quite deep there. You could not cross it at all without the bridge now. In the first instance, the ditch was shallow, but it has cut deeper. The water was turned loose on the top of the hill into a draw and ran down the hill into Sheep Creek.

The first year's run of water in 1902 did not cut that ditch very deep, but in 1903, it was big enough so we could not get through there; and since then, it has become bigger and deeper.

Redirect examination.

By Mr. James A. Greenwood:

I am familiar with the present diversion works up there and have seen the headgate. The availability of water down [fol. 193] (67) below for ranchers on Sand Creek has been affected during the time of diversion of water from Sand Creek into Sheep Creek in that, there just seemed to be less water--it made the supply less. The diversion works installed where the Divide Ditch comes out of Sand Creek are capable of diverting the whole or part of the flow of Sand Creek above that point. I have observed that they are operated to take it all. When that situation is in effect, there is just less water to irrigate with, which amounts to a condition that the ranchers (68) below cannot get enough water for their crops.

I do not know whether the fellows down below get the full amount of their appropriations or not. I have always had water and have never been short. I live closer to the mountains and do not have so much evaporation, and divert whatever water is available, regardless of whether our right was early or late.

My diversion works are in Colorado. They did not interfere with me; I always had enough—at the head of the stream. But, of course, the point where I diverted was not under the jurisdiction of the Wyoming commissioner.

Recross-examination.

By Mr. C. D. Todd:

I used the August Wurl Sand Creek Ditch for the irrigation of my ranch. There is only one August Wurl Ditch on Sand Creek. I believe the amount of its appropriation is 8.3. The (69) August Wurl No. 2 is seepage of water from Sand Creek. I have an August Wurl Ditch from Spring Creek. Spring Creek heads in Colorado and flows into Sand Creek at Chimney Rock. The date of the appropriation is 1903.

I have the August Wurl Seepage Ditch No. 2 from Spring Creek. Spring Creek and Sand Creek come together in Wyoming about one-eighth of a mile below the state line. Spring Creek flows into Sand Creek one-eighth of a mile in Wyoming below the state line. The August Wurl Seepage [fol. 194] Ditch from Spring Creek and from Sand Creek—these ditches are taken out in Colorado.

The Sand Creek Ditch was started in 1880, 1882. (70) I believe the date of its decree is 1903. August Wurl, my father, procured the decrees for these ditches in the District Court at Fort Collins, in District No. 48. That decree determines our rights in Sand Creek and Spring Creek, and the rights of everybody else, including the Eaton ditches—we are all in that adjudication decree.

The decree is the measure of the appropriation of our ditches in Colorado, both as to dates, priorities and amounts—it fixes all of those things in the decree, if I understand right. I cannot say that the Eaton Ditch ever interferes with our ditches.

Redirect examination.

By Mr. James A. Greenwood:

We are the first ones below the Eaton Ditch, and if there is any water there, we get it.

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(72) JOHN GOETZ, a witness in behalf of complainant:

Direct examination.

By Mr. James A. Greenwood:

I reside on a ranch on Sand Creek, in Wyoming. It is the Sand Creek concerning which testimony was offered in this suit yesterday. The course of the creek is both in Wyoming and Colorado. I have lived on that ranch, approximately, forty years. We do a little farming on the ranch, not to any great extent, mostly just a cattle ranch. We do a little farming—more in the past than right (73) now or in the past few years. In connection with our cattle raising, we have meadow lands and hay lands, and raise hay each year.

I have been familiar with the course of Sand Creek for the past forty years. I have been up and down the creek its full length many times, except as to the extreme headwaters of Sand Creek—that is, for a few miles, possibly. I wasn't right on the head of it.

[fol. 195] The creek is used for irrigation purposes, both in Colorado and Wyoming. I know where the diversion ditch and diversion works are located in Sand Creek and connecting with the Divide Ditch. I have been over the Divide Ditch. It is sometimes known as the Eaton Ditch. I know of just one ditch leading from Sand Creek to Sheep Creek. There has never been more than one.

(74) I have been often to the headgate of that ditch. I have knowledge of when that ditch was built. I wasn't there; I never was up there at the time it was being constructed. My knowledge as to the time it was built consists of—I can readily recall we moved to Fort Collins in 1902. We took our cattle down there and my father bought a farm down there, and I was down there that winter; and, owing to the fact that it was a rather dry year that year—anyway, as I recall it, some water was being taken through this ditch in 1902—the Eaton Ditch—made it a shortage of hay and we were compelled to go to Colorado with our cattle that winter. We left our ranch on Sand Creek and moved to Colorado, just temporarily, in the winter of 1902, to winter our stock. To my knowledge, prior to 1902, we did not experience any difficulty with reference to the amount of water necessary to raise our hay crops.

Since that time, we have, quite frequently, had shortages of water. I could not say that we have had a shortage every year since then. I could not say that exactly, but most every year, with few exceptions of heavy snowfalls in the winter. We have (75) had plently of difficulty in getting sufficient water within the last five or six years.

I have seen this structure in the creek bed when it was in operation so as to divert water from the stream into the ditch. The construction of that diversion works is of such a character as to control the entire stream, with the exception that a little might seep underneath the headgate [fol. 196] and run down through the sand; but it is shut off entirely from the top of it, and diverts all of it through the Divide Ditch.

When that obstruction, or the diversion gate is in operation, neither I or any of the ranchers on Sand Creek, are able to get anywheres near sufficient water from Sand Creek or tributaries above the location of these diversion works. If it is shut down tight, we get a little seepage water from outside streams or small tributaries. No, I did not understand the question. Neither I, nor the other ranchers on Sand Creek, whose ranches are below the diversion works, are able to get any of the Sand Creek water, or any of the water from the tributaries of Sand Creek which come in from (76) above the point of diversion of the Divide Ditch. The water that I get is what comes in below, or seepage in the stream proper.

I am familiar with the character of the water-shed, the topography of the land on the drainage area of Sand Creek. That portion of the drainage area which is below the Divide Ditch diversion gate would be foothill snow water which would come out naturally early, and that above the diversion is up in the high country, near the timber, which holds the water back for later use. We get early water sufficient for irrigation just for a short time in the early spring, say from possibly about May 1st to May 15th, or until the headgates are closed down up on Sand Creek, and then the shortage begins. The headgates are usually put in operation so as to create this shortage, as near as I can recall, around the middle of May, and from then on it gradually gets less.

I am familiar with the various ranches on Sand Creek, as well as my own. The shortage applies to all the ranchers down (77) the creek, regardless of the date of their priority or right to water.

[fol. 197] I have, approximately, twenty-five thousand acres of land in my ranch that operates on Sand Creek. Of this amount, I would judge around three thousand acres are irrigable hay meadow. That is making a guess at it; I might be off quite a little one way or the other.

I am familiar with the names of the various ditches that take out water for my lands. My attention being directed to the tabulation of adjudicated water rights, Division No. 1, Wyoming, would state that my lands are located in Division No. 1. On Page 91 of this tabulation, there are a number of rights there with reference to Sand Creek and tributaries. It shows the various rights by which my lands are irrigated.

(78) Practically all of these rights are territorial—taken out while Wyoming was a territory. I am still using these rights, to as great an extent as possible from the waters available, for irrigating purposes and the purposes for which they were decreed. These rights are the ones I have testified as having experienced a shortage of water.

Cross-examination.

By Mr. C. D. Todd:

I testified as having twenty-five thousand acres of land, approximately, three thousand acres of which are irrigated, as near as I can guess at it. I haven't got a tabulation on it. As I stated, I might be off quite a little one way or the other. According to what I can count, I use seventeen ditches to irrigate with. These seventeen ditches belong to my land. They all take (79) water out of Sand Creek. Their names are, the Richards Ditch, Gullihan No. 2, Braden, Nedart, Red, Gullihan No. 1, Gullihan No. 2 again, the Red, Gullihan No. 1, Davis Brothers No. 1, Richards, Lone Tree, and enlarged Davis Brothers Sand Creek No. 2, Davis Brothers Sand Creek No. 2, Alice Hardin, Davis Brothers No. 2, Lone Tree No. 1 reservoir Ditch or extension, and Lone Tree No. 2 reservoir.

[fol. 198] My ranch land begins on Sand Creek about seven or eight miles below the Wyoming state boundary. They are scattered along down stream fourteen or fifteen miles. There are generally small ditches made for meadow irrigation.

We begin irrigating about the latter part of April, say from the 25th of April to the 1st of May. We aim to turn the (80) water in the ditches and irrigate, and would irrigate up until ten days of when we begin haying, if the water was available. We begin haying around the 20th of July.

We turn our water on as soon as we can get it in April, or early May, and let it run continuously on these meadow lands. We have measuring devices in just a few of our ditches—just in three or four, or four or five ditches, is all. We use the flooding system for irrigation of the meadow lands. We have been able to run water continuously when it is available, but the way it has been the last few years, we tried to make the best use possible by alter-

nating from one ditch to another. When we have the water, each ditch is turned on to a piece of meadow land and it floods that land for a long time, depending on how long we have the water.

As to the irrigation of our meadows, we haven't had that water, that I can recollect of, for years and years. We do not aim to flood it day in and out. We do shut it off occasionally, (81) understand, and give the ground a chance to dry off a little, and then turn it on again. We do not have any measuring devices in our ditches to see whether we are getting our appropriations as decreed to us, but open the ditch and let it run. We have headgates in a few of the ditches.

I would say that this is the customary mode by which the meadows are irrigated under Sand Creek on the Wyoming side. That is, more or less, the customary way for irrigating. We do change it around some, you understand; [fol. 199] we do not turn it out in one spot and let it run there continuously. We do not aim to do that, either, but, to begin with, we certainly try to cover the entire area as much as possible. I would not know for how long periods of time.

Only a few of the ditches have any headgates at all. I do not have any measuring devices to keep track of how much water we divert for the appropriations to those particular ditches. It could be measured in these headgates, I presume. We do not customarily measure the amount of water we divert in these ditches. The (82) water officials of that division or district do not come regularly to supervise the quantity of water we turn out. It has been the custom of all the ditches on lower Sand Creek to take the water and help themselves and use it as they want. That has always been the customary way of irrigating meadows, both on the Colorado and Wyoming sides of the line.

I stated I was familiar with the water-shed of Sand Creek and have been for a good many years. I am familiar with the ditch that diverts water from Sand Creek over the divide into Sheep Creek. It is commonly called the Divide Ditch, or Eaton Ditch. I would not know which would be the proper name for it, but there is just the one ditch. It might sometimes be called the Sand Creek Ditch. I have also heard it called the Wilson Supply Ditch. As near as

I can guess, I have heard the whole system called the Wilson Supply Ditch. It is also known as the Sand Creek system. It is (83) like in every neighborhood, you attach a local name, and sometimes an official name, and they are used alternatively.

I have been up to that part of this system which collects water through the Wilson Supply Ditch from Deadman and other tributaries and discharges into Sand Creek, but have only been familiar with it for the past two or three years. I never was up there at the time of its construction, [fol. 200] and never met R. Q. Tenney or Mr. Wilson. I have been to the outlet of Deadman Ditch, where it drops into the headwaters of Sand Creek. I followed the ditch from cabins on Deadman down to the outlet of that ditch, to where it empties into the headwaters of Sand Creek.

(84) I know nothing about when the ditch was constructed, but do know that it carries water and drops it into Sand Creek, and that same water is carried down Sand Creek to the diversion dam mentioned, in Sand Creek, and that that water, plus Sand Creek water that is available, are both diverted across into Sheep Creek. The water that comes to the diversion dam in Sand Creek is not all natural Sand Creek water; part of it is Deadman water.

I would not expect our appropriations would apply to any part of Deadman water. It would never have gotten there if it had not been for the ditch. There are two kinds of water in Sand Creek at the point where the diversion is made into Sheep Creek—part Deadman, and part Sand Creek flow.

I have lived in the vicinity of these Wyoming ranches (85) near Sand Creek for forty years, and was fourteen years old when I moved on the place with my folks. I moved there with father as part of the family.

Redirect examination.

By Mr. James A. Greenwood:

The irrigation of meadows is by diverting the water and letting it spread over the meadow, which is called flooding. In the irrigation of our meadows, we are confined to our appropriations as much as possible. It is not our intent, nor our practice, to divert the stream, regardless of what we are entitled to. At times, there would be no possibility

of getting our appropriation—most of the time, on account of shortage.

(86) I do not contend that our water rights have any right to claim an interest in the water that is contributed from [fol. 201] Deadman by artificial means. It is merely Sand Creek water, and its proper tributaries.

I have complained to the parties who operate the Divide Ditch and the diversion works there, about the taking of Sand Creek water. In a few different times, we have had a little relief, so-called, but not enough to do any good, as I would call it, to amount to anything.

As to the whole ditch system, or the Wilson Supply Ditch, as being the Sand Creek Ditch—that is just general information, and those terms are used intermittently as to what may be that ditch. It is just the one ditch. When I refer to a system, the ditch on the hill, as the Deadman Ditch, Sand Creek Ditch, and Sand Creek as a conveyor, and what we call an extension of Deadman (87) Ditch, as to whether I am speaking of what it is commonly called—it is the only knowledge I have of it. The natural channel of Sand Creek is the only connection I have any knowledge of between Deadman Ditch & Divide Ditch. I do not know whether they were built at the same time; I do not know only just from hearsay that the Deadman Ditch was built later. This is not of my own actual knowledge.

Mr. Wurl's ranch lands are in Colorado, and he testified that he was seldom short of water. I do not know, on occasions when water was turned down on protest for use below the diversion works, who got that water unless he did. It did not get down to benefit us—very little, if any. I could not say, not a bit of it; there might have been a little raise in the creek, but there certainly was not enough to make it worth while. In other words, he was sitting in there below the point of diversion, and beyond the jurisdiction of any Wyoming water official, and he just took it as it came down.

[fol. 202] (88) Recross-examination.

By Mr. C. D. Todd:

I did not know that what we call the Divide Ditch between Sand Creek and Sheep Creek, and the ditch farther up on Sand Creek that went to Deadman and beyond, belonged to the same company that the Eatons controlled. I suppose

they do; they operate under those terms and were using it altogether, as far as I know.

The elevation of the country down at the Divide dam, and the land along Sand Creek, is lower than the land at Deadman Creek. I would say that ordinarily, as the snowfall begins to melt in the spring, Sand Creek furnishes the first water. I do not believe I would be in position to state which of them ceases to have any water first as the season goes by and the snow goes off. It is possible that the Deadman would have a little water, a little later water, than Sand Creek. Deadman is located higher and it is in a (89) timbered country. Sand Creek is also above the diversion, in a highly timbered country, but not quite so high as Deadman.

Redirect examination.

By Mr. James A. Greenwood:

I had ample Sand Creek water in the late season prior to the construction and operation of this diversion dam. I can recall that plainly—that before this ditch was in operation, we always had plenty and sufficient water for irrigation as long as we needed it. Sand Creek, as a general thing, is not a stream that goes dry in July and August, but it could happen. It has late water as well as Deadman.

Recross-examination.

By Mr. C. D. Todd:

I am not irrigating a larger acreage of meadow lands now than I was in 1902. I do not hardly think tha. any of the ditches have increased their quantities since 1902. I [fol. 203] cannot hardly recall—there might be some water rights there that came out after that, possibly. I would have to refer to the decrees there, but I do not recall that we built any ditches since then.

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(90) Lemuel E. Cook, a witness in behalf of complainant:

Direct examination.

By Mr. James A. Greenwood:

My business is locomotive engineer, and I reside at 608 South 5th Street, Laramie, Wyoming. I have a ranch in

Albany County, located on San Creek, up close to Mr. Goetz, and am farming that. I have had a ranch since October 4th, 1900; it was my homestead. It consists of six hundred forty acres of land. I have had it leased to Mr. Goetz since 1913. Before that time, I operated it myself.

The ranch contains both agricultural farming land (91) and stock land. I farmed forty acres at one time. There is about four hundred eighty acres of meadow land, subject to irrigation. It has been irrigated and I have a water right for it. The names of the two ditches are the Bush Ditch No. 1 and the Cook Ditch No. 1. I know, approximately, the dates of the priorities of those two ditches. The Bush Ditch is July, 1897, and the Cook Ditch is July, 1901. They were taken out for the purpose of irrigation, and have been used continuously for that purpose since they were first taken out.

I am acquainted with a good portion of the territory where Sand Creek is located—both the upper part and the lower (92) part. I am on the lower portion of the Sand Creek water-shed and am acquainted with that water-shed up as far as the headgate at the diversion point of Mr. Eaton's Divide Ditch.

I believe that ditch was constructed along about 1902 or 1903. I was first up there in 1903, and the ditch was there [fol. 204] at that time. There was a diversion gate or works in the channel of Sand Creek at that time, but not the headgate that is there now. The first one was washed out. I have inspected the one that is there now.

The diversion gate that is there now is capable of shutting off the entire flow of Sand Creek. I have seen it do that so that there is not a drop of water passing down the channel (93) of Sand Creek below that point, except what came in from tributaries below. The operation of that diversion works through the Divide Ditch has interfered with my ability to get full appropriation of my water. I scarcely got any water for the last ten years. Prior to that time, we had plenty of water, except in 1903, which was a dry year and everybody was short. The particular shortages I have experienced have been in the last ten years.

Mr. Goetz has been leasing my ranch since 1913, but having been out to the ranch, I have a personal knowledge of the fact that this water has not been available. I have complained quite frequently about the existing conditions

to the State Engineer, but did not get any relief until last year. The relief I got last (94) year was, we went up there last year and the State Engineer phoned over, I believe, to Mr. Eaton, and had him raise the headgates. I believe I went over there last year on the 20th of June. Mr. Goetz, Mr. Greenwood and the State Engineer, Mr. Whiting, were with me. The headgate, or the diversion gate was in operation that day. All the water was going down the diversion ditch that day, and none below, down Sand Creek.

I actually irrigated, myself, in connection with my farming operations up until about 1907, whenever there was water available for irrigation. I had a regular headgate upon my ditch, made out of two-inch plank. I did not turn out and divert more than my appropriation. I let the water for my meadows spread out and flood the meadows, but I [fol. 205] did not turn out the whole stream and flood it over.

I am not very familiar with the ranchers on Sand (95) Creek—up above the diversion headgate. I was never up farther than the diversion headgate. I am acquainted with the various ranches and know they have not been able to get water in the past years because it was going down the diversion ditch.

Sand Creek, uninterrupted by the diversion works, would furnish late water from the higher altitudes up in the upper reaches of the creek. In speaking of the diversion works as taking Sand Creek water, I meant the headgate of the Divide Ditch that connects Sand Creek with Sheep Creek and takes the waters from the channel of Sand Creek through that ditch, over the divide, to Sheep Creek.

Cross-examination.

By Mr. C. D. Todd:

My two ditches on the stream are about three-quarters (96) of a mile apart. The meadow land which I irrigate is kind of intermittent. There is little knolls around, and some of the knolls are not touched, but we irrigate between the knolls on the meadow land—just little greasewood knolls; Section 24 lays practically level.

I have no measuring weirs in my ditches showing how much water we get—just an ordinary plank headgate. You

just go and help yourself to the water. That is the way they all do. I just open my headgate when I get ready to irrigate, and turn her loose. Lately, we have had to turn it loose just as soon as the water started to run, or we do not get any. The last two or three years have been pretty dry for me. I haven't noticed all of the streams, but I know there wasn't any going down Sand Creek.

[fol. 206] When we turn the water into the ditch in the spring, (97) we let it run continuously until the hay is about ready to cut, and then we close the headgates down in time so the meadows will dry off in time to cut the hay, along the 10th or 15th of July. We have to turn it off earlier than the 10th or 15th of July. It takes two weeks to dry up.

All of the drainage runs back into the stream. On my place, generally, if there is any surplus water, it generally runs back into Sand Creek. A portion of the soil is sandy underneath and a portion is clay. There is a strata of about eighteen inches of sand, and under that is rock. You can dig down any place ten or fifteen feet on the place and get water—it is very easy water. It takes very little water after you get it once wet. A large part of what we divert runs back into the stream from seepage or from the flow on the top of the ground. This is the custom of irrigating meadow lands in (98) that neighborhood. I have been irrigating just about the same as all of the rest of them.

There are several little spring creeks tributaries to Sand Creek coming in below the Divide dam. They furnish a small portion of water. There is an alkali creek runs in up by the Jack Brown place, and when water gets low in Sand Creek, it pollutes the water pretty bad. We use the water for household purposes when the water is high, but when it gets low, we have to haul it from the river. For domestic purposes, we have to haul it from the river, but for irrigation, we use the creek.

I am not familiar with the Divide Ditch above the headgate. I was never above the dam or the headgate. I never was up at all above the headgate, I do not suppose, a quarter of a mile—not in recent years since they built it. I was up there in 1896.

[fol. 207] (99) I could not give you any information about bringing the water from Deadman into Sand Creek and then diverting it into Sheep Creek beyond what I have given.

My Bush Ditch dates from 1897, and my Cook Ditch dates from July, 1901. I lease my lands to Mr. Goetz. He has not been farming them; he has used them for stock and meadow purposes. He uses my ditches the same as I used them. He could not use them very well on his own land. My ditches irrigate my own land, and no other.

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(100) AGNES ZIMMERMAN, a witness in behalf of complainant.

Direct examination.

By Mr. James A. Greenwood:

I have resided since 1882 at Home. Larimer County, Colorado, on the Cache la Poudre River. My business or occupation until 1905 was, principally, hotel business; after 1905, it included independent reservoir operations; I have engaged in independent reservoir operations in a small way operating a reservoir, selling reservoir and storage water on the open market to various consumers.

In 1923, I filed on a large channel reservoir on the Cache la Poudre River. A reservoir had been filed on in 1906 by George B. McFadden for Denver interests, and also filed on on the stream at a higher point by the Greeley Electric Company. My damsite was between the two. I employed Mr. George M. Bull (101) a consulting engineer of Denver, to draw up my dam specifications, a rock-fill dam. Mr. Bull is considered probably the best rock dam expert in the United States. He built my plans, and later made quite an extensive preliminary investigation of the water supply for the reservoir.

Mr. Todd: Whereabouts?

The Witness: On the Cache la Poudre water-shed.

Mr. Temple: Is this in response to a question, or a narrative you have prepared to go into the record?

[fol. 208] The Witness: A narrative.

Mr. Temple: If it is a narrative, I want it understood that we are to have a copy of it.

Mr. Greenwood: This is perhaps an extended answer to the question as to her operations as an independent reservoir operator.

Mr. Temple: We object to it as not responsive, and, if it is a narrative in response to the question, we demand that a copy of this narrative be furnished us at once.

Mr. Greenwood: I haven't seen one.

The Witness: I think I should state more definitely that this is chronological, instead of narrative; I am simply giving it in my own way.

I am relating what I did with reference to this large reservoir I filed on in 1923. After Mr. Bull's investigation, I became very much interested in winter storage—this reservoir is located quite high on the stream, and I was interested in making (102) winter storage on the Cache la Poudre River. In connection with this, I investigated Mr. George B. McFadden's spring flow measurements made in cooperation with the United States Geological Survey in 1909, 1910 and 1911. I was investigating these by myself and my attention was called to the fact that that would not be exactly reliable, that additional water was being brought in through the Laramie-Poudre Tunnel and simply donated to the river.

Mr. Temple: May I ask a question in connection with that?

Mr. Greenwood: Surely.

Mr. Temple: Is the reservoir you are talking about in operation?

The Witness: No.

Mr. Temple: Was it in operation?

The Witness: No.

[fol. 209] Mr. Temple: Has it ever been in operation?

The Witness: No.

Mr. Temple: Then we move to strike out the answer as not responsive.

Mr. Greenwood: The statement made is in connection with her investigation for a contemplated construction of a reservoir, and leads up to her definite knowledge of water being diverted through the Laramie-Poudre Tunnel in the years 1922 to 1924, during the off season, that was never reported to anybody.

Mr. Temple: She is testifying about 1909, 1910, and 1911, now, or talking about it.

Mr. Greenwood: 1923, I believe.

The Witness: I was speaking of the filing made—I was (103) speaking of investigating Mr. McFadden's stream flow investigations of 1909, 1910 and 1911, which was made in cooperation with the United States Geological Survey. I knew Mr. W. B. Freeman had been connected with that investigation in behalf of the United States Geological Survey, and I went to him to give me some advice on what he had done on the river—he was probably the best informed man at that time. In connection with this tunnel-river water that was being run, I did not know at that time it was being run without a record, and I assumed I would be able to find that record in the office of the division engineer. I made what I thought was a very thorough search in the office of the division engineer; I could not find any record of the water of the Greeley-Poudre Tunnel I could not find any record of running water from the Laramie River. It should have been recorded as brought from District 48. It should have been recorded as brought into District 3. There was no available record of it that I could find.

[fol. 210] I looked in the office of the division engineer in Denver. I asked Mr. Freeman if he would come up and try to help me locate that water, which he did, and he did not have any more success in locating that water than I had. So we made a trip to Fort Collins to interview the engineer of District 3, who was Mr. McAnnely.

He told us he knew nothing of any water being run. I knew water was being run, so I asked Mr. Freeman if he would immediately make a trip to the tunnel with me and investigate that (104) water. I wanted to determine how much water was going into the river, and being simply run to the river, and, in that case, would be available for claim. I wanted to determine the amount of foreign water for the purpose of claiming it for this reservoir site. If it was true that it was being brought into the river and run as the general river supply, it would be available for claim. We made that trip to the tunnel, and Mr. Freeman investigated it on the ground and found something like 12 second feet passing through unrecorded.

The date was some time in February, 1926. I do not remember the exact date. I knew that that probably increased a little later on, so I employed other engineers later to make current meter investigations, measurements

and investigations of the tunnel flow, and I very soon found—I think I had a man on for some little time—that I would not be able to do anything unless I established my own rating devices, automatic gauging devices.

I employed a young chap by the name of Arnold, and Mr. Ben F. Powell. In connection with this, I found, not only was this condition very largely prevailing throughout the trans-mountain diversion, water being brought in more or less and, what they called, donated to the river, but I found also a lot of legal complications. So I employed a Denver attorney, Mr. Charles H. Pierce, and we investigated the way it was being run. After investigating and making [fol. 211] meter measurements throughout the district, we found that the most of these diversions had automatic measuring devices, and the automatic gauge charts should have been filed in the office of the (105) state engineer; but we did not find any measurements.

The automatic gauge charts were all of the trans-mountain diversions being brought in. This included what I was most specifically looking up, the tunnel, because this water was being run in connection with large quantities and should have been available for my use had it been run simply to the river. When we visited the state engineer's office, we found these charts were not on file, so I had my attorney, Mr. Pierce, and Mr. Freeman make a demand on the state engineer to have these charts brought in, which he said he would. After a few days, we were told that these charts had been destroyed by the water commissioner of District No. 3. After awhile, we got a few in, but they were very scattering and had a great many discrepancies.

The charts I refer to were the gauge height charts on the tunnel diversion. I was told by Mr. McAnnely, water commissioner of District 3, that they had been destroyed. They never were produced. My statement has reference particularly to an investigation I was carrying on in the years 1925 and 1926.

(106) I saw water being run through the Laramie-Poudre tunnel in 1923 and 1924, and I am quite sure in 1922, but I did not know how it was being run. I did not make any investigation, I did not know whether it was unrecorded or not; my first knowledge of that fact was when Mr. Freeman made the investigation. I saw water running during the winter at various times. I do not know whether

it was a continuous run or not; I did not make any check on it, but it was running.

I did not know at that time whether it was being recorded or not. I did not know in 1922, 1923 or 1924 as to whether it was being recorded or not. In 1926, we found it [fol. 212] was being run without record. Mr. Freeman found on the ground that the automatic gauging devices were not running. There were, approximately, three thousand acre feet of water run in 1926 through the tunnel without a record. That unrecorded water was delivered from September until May, the 4th, I think it was.

I have been living at Home, Colorado, during the last ten years and have, at more or less frequent intervals, inspected the (107) trans-mountain diversions from the Laramie to the Poudre. From my knowledge and information from this inspection, it would appear to be quite a common practice to divert water without recording it. That practice would be pursued, usually, in the early season and at the end of the season—at the beginning of the irrigation season and at the end of the irrigation season.

The irrigation season begins about April 10th and continues through until the middle of October. As formerly stated, water is run even during the irrigation season at times without a record, and also, in the off season. The October season is usually the storage season. By the "storage season" I mean the time of year when trans-mountain water is stored in reservoirs for the next season's use.

I am acquainted with the headwaters of the Laramie River on the other side of the ridge. I have been over there frequently. (108) The Skyline Ditch is located on that side. It has headgates on the Laramie River headwaters. I know where the headwaters of the Laramie River commence and where the west branch of the Laramie River comes in. I am acquainted with all the various tributaries along the west mountain slope, including Rawah Creek, which is a tributary of the Laramie River.

The Rawah Creek is located, with relation to the west portal of the tunnel which conveys Laramie River water to the Cache la Poudre, approximately,—I should say that comes in about two miles below the Laramie River Tunnel. I may not be correct on that, but it is below.

[fol. 213] Rawah Creek water, if left to pursue its natural course, would not find its way at any time into the tun-

nel. Rawah Creek water has been delivered to the tunnel, the first time, in 1931.

(109) That was made possible through the completion of the Rawah Ditch, also called the West Side Collection Ditch. I am familiar with the location of that West Side Collection Ditch and have been over it and know when it was constructed.

The original construction was in 1909 and 1910—part of the construction; the completion was in 1929. The construction and completion in 1929 was practically upon the plan or survey as outlined in 1909 or previous thereto. I think it was re-surveyed in 1929. I do not think it is quite the same survey. There are some alterations, I believe, because it was being re-surveyed in 1929, and the construction carried it to the mouth of the tunnel by a ditch entirely independent of the source from which the west branch of the headwaters of the Laramie River continued to the tunnel.

(110) There is no connection between the two. I think there are portions of the West Side Collection Ditch that were the original survey of 1909. I saw the first construction of it and it looked to me like the same ditch—that is, the center portion, practically. The lower portion was never completed, and it was not completed to Rawah Creek.

The other end of the ditch, where it connects with the tunnel, in that portion of the ditch which comes across the valley, was constructed on the new survey in 1929. That was not a part of the original purpose. I saw it when they put the steam shovel in it first, and it was an entirely new ditch and an entirely new plan.

Rapid Creek and, I think, one or two small creeks are also tributaries along the course of this Ditch, from where it taps Rawah Creek to where it delivers water to the tun- [fol. 214] nel. I did not observe the volume of water that was delivered to the tunnel in 1931, (111) but in 1932. I made several observations. Water was first run in 1931, but I did not make my first observation until May, 1932, and thereafter, I think, once or twice each month during the entire time it was run. That would be during the months of June, July, August and September.

I have seen a great deal of stream flow measurements. I think I have a very good idea of the volume of water that is passing through a ditch or stream, particularly with

reference to steep grades. I have been present and seen stream flow measurements made a great many times and had a great many of them made in my own behalf, and have observed the volume compared with the measurement record.

(112) In my judgment, the highest run-off, or the highest amount of flow delivered through the tunnel in 1932 at the times I observed it, was, approximately, 85 feet. They consumed practically all of Rawah Creek. They put in sand bags in the diversion dam to stop any water. The very early run-off would run over, but the rest of the time, it would take practically all of it.

I know Water Commissioner, Mr. McAnnely, and have had conversations with him with reference to how they kept track of the trans-mountain diversions.

Mr. Temple: Will you fix the time and place?

I recall the conversation between Mr. McAnnely, Mr. Freeman and myself, in 1926, when Mr. McAnnely stated that they did not keep any record—that is, the water commissioner—that it was the duty of the water commissioner in 48 to report that water.

(238) Cross-examination.

By Mr. William R. Kelly:

I am interested in water diversions in the Cache la Poudre Valley. The John Zimmerman reservoir—the reservoir I filed on in 1923, is the one in the channel of the river with a capacity of seventeen thousand acre feet. The reservoir is not constructed—only the pits. I never [fol. 215] stored any water in it.

I am interested in the Zimmerman reservoir on Cameron Pass, diverting water from the Cache la Poudre watershed. (239) Its capacity is, approximately, four thousand acre feet. I do not know whether that is something under six million cubic feet capacity. I think it is about six million—I think that is what I could discharge through it. The reservoir priority is No. 72, with date of 1904; it has the priority of 1904. I do not think it is a late priorty on the Cache la Poudre River. I think it is quite a good priority; there are quite a good many others of the same priority.

I did not store any water in it or sell any water out of it last year. I did not sell any water out of it in 1930, or

in 1931, or in the past five or six years. There was water available, but I did not get it.

(240) That is all the reservoirs that I am interested in personally. When I said I was engaged in independent reservoir operations, I meant these two reservoirs. I have been endeavoring to sell these reservoirs from time to time. One of them, I have never tried to sell—the small one, which is the six million cubic foot one. I do not know whether six million cubic feet is about 130 acre feet unless I stop to figure it up.

I did not try to sell the big reservoir, on which I filed, to the Water Supply and Storage Company; I did to the Laramie-Poudre Irrigation Company and the Eaton Ditch Company. The Eaton Ditch Company was very much interested at one time, but they did not buy it. My inability to sell did not cause me to have any feeling against the other appropriators of the Cache la Poudre Valley.

(241) I am not subpoenaed here as a witness; I am a volunteer witness. I am not under the employ of the State of Wyoming. I have not been under the employ of the State of Wyoming, or the State Engineer—just a volunteer witness to help out.

[fol. 216] As to my having had quite a bit of litigation over water rights with other appropriators in the Cache la Poudre Valley, every adjudication proceeding brings everybody into court on litigation. I have not been particularly unsuccessful. I think I was unsuccessful at one time.

I was satisfied with my adjudication results in the last one. I objected to the decree of Cobb Lake. I didn't object to the decrees of the Zimmerman water system; I was a claimant in that. I did not get as much out of the amendment as I should have (242) gotten; I got my full amount on the first application.

I employed Mr. Powell myself to find out what was going into the river on the water-shed. I had him on the Grand River diversion from the headwaters of the Colorado. I had him to investigate various diversions that came in, to find out what was the supply from the Colorado water-shed and what was the supply on the Cache la Poudre water-shed.

My reservoir is about thirteen miles below the South Poudre. I still claim the filing is in force. I have dug

test pits and that sort of thing; I think it is as much in force as a great many others; I think it is as much in force as the Elk Horn reservoir site, for instance. The Elk Horn reservoir is entered for decree, I know that much. I think the evidence went to show all they done was build a fence. All I have done is dig test pits, so we are about on a par. As to whether that is the way I build reservoirs—that is evidently the way you build them.

(243) I would have sold water during the last five or six years if I had been permitted to sell. It was not my fault that I did not sell and did not fill; other junior rights were filling and selling.

I am not present here as an expert on water measurements. I do not claim to be an expert on water measure- [fol. 217] ments. I got the figure of 12 cubic feet per second out of the tunnel from Mr. Freeman, and I think Mr. McAnnely gave him that estimate on his measurement. I heard Mr. Freeman testify that he estimated it at 9 cubic feet, but I heard him testify he got it from McAnnely. Whatever his testimony is, is in the record here. I do not think I am better in estimating the flow of water than Mr. Freeman.

I did not make any measurements or estimates of the flow out of the tunnel prior to this 1926 date when I was there with Mr. Freeman, or of any other diversions. I did not make an estimate of the flow into the Cache la Poudre Tunnel prior to the 1926 time.

(244) My reservoir business is selling water on the open market, which is summer and flood water storage, whatever is available. There is no definite irrigation season. I don't know when the irrigation season began this year in the Cache la Poudre Valley. I don't know whether it began as early as March 1st.

My testimony that I estimated three thousand acre feet were run through the tunnel in 1926 and that I stated I based that figure on the months of September to May 4th —that was what Mr. Freeman's investigation was, or Mr. Duvall, the observer, I think. I was purporting to state to the court what the unreported diversions were. I did not hear Mr. Freeman testify that he found the record of those diversions as late as 1925. I do not know of any. When I used those months from September to May 4th,

I meant September, 1925. I think, to December 31st, 1925, is what Duvall—Duvall was (245) deputized by the water commissioner to take charge of the water.

I have not seen his commission. I have seen his reports in the division engineer's office as an official observer, and he made those statements to us. I did not see his reports in the year 1925; he simply told me he did that. Mr. Homer Duvall was on the works, taking care of it and was [fol. 218] the observer for the Laramie-Poudre Irrigation Company, deputized by Mr. McAnnely, the water commissioner of Water District No. 3. I think that he told us that on my first trip up with Mr. Freeman, in February, 1926; I am sure it was. That was the only time he told me that, but he had been in there for some time.

His connection in that regard was to observe the water and take charge of the water that ran through the tunnel. He told me he was employed for that business in the winter time. As to seeing any commission of employment, or whether it is all (246) hearsay—it is what he told me, something that somebody who is not here told me—he told me that. I do not know whether it is a fact or not; I only know what he told me, and then I saw his name on the water commissioner's report, reported as an observer by Mr. McAnnely.

I did not see it on the reports for the months of October, November and December, 1925; there was no report. I did not see it on the reports for January, February and March, 1926; I saw that in the summer reports. When I stated this figure as my estimate of the unreported diversions, and as to my assumption there was no record of any of those diversions for any of the months from September, 1925, to May 4th, 1926, I just recalled Mr. Duvall's statement and Mr. Freeman's statement to me, from what his computations were. I did not compute it at all. It was just what I heard those two men saying.

I arrived at the three thousand acre feet from a written report by Mr. Freeman. I do not know how many cubic feet per second I took as a base per day for diversion. I do not know how many days I took; I did not see any daily report. I simply (247) took it as Freeman's written report to me, that three thousand acre feet had run unreported. That is simply what Freeman told me. It is

not based upon any estimates or measurements I made; I did not make any.

[fol. 219] Duvall said to arrive at that sum, it included part of the year 1925. Incorrectly answering how much was run through for 1926, I either misunderstood the question or improperly included part of the year 1925 in reaching three thousand.

I recall the construction of these collection ditches on the Laramie side, while the tunnel was being constructed, in 1909 and 1910. They were only partly excavated. I think only the dirt had been done on the west side. I do not know whether any tunnels had been built on the West Side Collection Ditch. I suppose the (248) object of them was to bring water from the tributaries of the Laramie into the Laramie River and into the mouth of the tunnel.

I have no definite knowledge that the object of the West Side Collection Ditch was to bring Laramie water into the tunnel from Rawah Creek and intermediate tributaries. I assume that was the object. The West Side Ditch did not tap Rawah Creek at all at that time. I do not think there was any clearing, or any ditch, up there within a mile of it, as I remember that. I would say that the ditch construction was about the center of the ditch, about the central portion of what I recognized as the ditch line. There may have been a right-of-way, but there was no ditch—I know that. The ditch had been constructed in sections along in that general direction. I would not definitely assume to say that the timber had not been cleared off the right-of-way. I didn't know that the object of the ditch was to get water from the streams it intersected and make available at the west end of the Greeley-Poudre Tunnel. You see, I knew nothing particular of their plans; I assumed it was.

(249) I heard they were building a reservoir dam in 1911 when the former suit of Wyoming against Colorado was begun, which dam was just below the tunnel across the bed of the Laramie, and it leaked so much they had to abandon it. I have seen the headgate construction. I do [fol. 220] not know that the works would naturally throw the water from the West Side Ditch over into the tunnel. It looked like a very down-grade to me. I question very much whether it would have thrown it in or operated. Perhaps that was the reason for giving it up, I don't know;

but it looked very much down-grade to me. I did not run any levels on it. I am judging it by the looks of it, where they had their dam. I do not just know what their reason was for not constructing it.

In answer to a question by Mr. Greenwood that the resurvey and construction carried it to the mouth of the tunnel by a ditch independent of the source from which the west branch and the headwaters of the Laramie continued to the tunnel, I answered, "Yes, entirely independent,"—that was entirely independent from any ditch I had ever seen constructed there. I have never seen a ditch over that flat. It extended to quite a flat and to what I would call the first Rawah construction. It was entirely different from any ditch I had ever seen planned, or any evidence of surveying or anything; it impressed me as being entirely new.

(250) I do not know that the lowest part of the constructed ditch, which was constructed at the time the tunnel was being built, was at a higher elevation than the west portal of the tunnel. I never took any measurements. From my observation, I should say that was entirely different from the original plan. I never saw that portion of the ditch under that kind of construction or any kind of survey prior to 1929. It was not completed prior to 1929. Just certain portions of the work, about the center part of the ditch, as I remember. There was a portion of a dam across the bed of the Laramie River to divert what water would come down that distance west of the tunnel to the tunnel diverting works prior to 1929, and a headgate. I saw the cement tubes or discharge tubes there.

[fol. 221] I think that the long steep inlet canal from the Laramie River itself to the west portal of the tunnel was in connection with the tunnel diversion from the Laramie River. As I remember it, it was simply an open ditch. They had to have some sort of diversion prior to 1929 to turn the water from the Laramie River. The completion of (251) the West Side Ditch now brings water into the valley of the Laramie above the west portal of the tunnel. If they had built the same ditch then and followed it along the same survey as they are following now, it would have brought the water into the valley of the Laramie above the west portal of the tunnel; otherwise it would not. If they had finished the reservoir dam it

would not have run into that. I know that from observation. It is so far below it, it could not possibly.

I do not do any engineering or take elevations. I did not have anything to do with the first construction. I am giving you my observation, and my observation is that it would not, the damsite of the tunnel reservoir is so far below the mouth of the Laramie-Poudre Tunnel. Apparently the object of that work over there was to bring the Laramie River water into the Cache la Poudre River, but I do not know. I suppose that the object of the dam below the tunnel dam, across the valley of the Laramie River, to force that water up to the mouth of the tunnel, must have been the plan from the appearances of it.

(252) Redirect examination.

By Mr. James A. Greenwood:

Mr. Freeman was employed by me to make observations and to report them to me. That employment did not have any connection whatever with this proceeding here. I did not have anything of that kind in contemplation. My object was to determine available water supplies in connection with my contemplated reservoir construction.

The plan was never carried out with reference to the relation of the West Side Collection Ditch and the original [fol. 222] scheme to establish a storage reservoir or collecting reservoir, from which water would go through the tunnel. I do not know if it was abandoned or not; I heard two different things.

Mr. Kelly: I object to that as hearsay.

Mr. Greenwood: I asked her if she knows whether it was completed or not.

It has never been completed. I was on the ground a (253) short time ago and it was never completed. It never has been completed and used. I have seen where the proposed structure of that reservoir was to be built across the valley of the river. I am familiar with that territory. If that reservoir had been completed as a part of the present West Side Collection Ditch, I am quite sure that a part of the new construction would have been submerged by the backing up of the water in the reservoir. If it was

capable of backing up the water, the low part, I am quite sure, would have been submerged.

The ditch had not been connected or completed to Rawah Creek. I do not know about the blazings. My observations were not that close; but I know that the ditch was not completed to Rawah Creek. There was no construction that far up, nor any construction as far down toward the tunnel as where it is now—not even down that (254) far on the mountainside. It would not require construction nearly as far as the ditch is now constructed on the mountainside to deliver Rawah Creek water to the reservoir under the original plan.

Mr. Freeman did not find any record of the diversion of the winter flow in the state engineer's office. I was with him when he examined them. We did not find any reports. If they were in there, we could not find them. We questioned the state engineer, and he said there were none. I also questioned Mr. McAnnely, water commissioner of District 3—I noticed some of the summer flow showed he reported some reports—and I asked him for the daily re- [fol. 223] report, and he said that he did not have them, that that was the duty of the water commissioner of District 48 to turn them in, and I later asked the water commissioner of 48 about it and he said he did not have any (255) records, that Mr. McAnnely took complete charge of them. As a matter of fact, that is true—Mr. McAnnely deputizes some one of the workmen on the construction works to open and shut the headgates and regulate the flow and report to him. The water commissioner of 48 has nothing to do with them. That is the way that had been buried when we investigated it.

I am quite sure that some of the three thousand acre feet of unreported water to which I testified, was in December, 1925. I am not so sure in my own mind, speaking of unreported water in the non-irrigation season, as to whether there is a distinction or not between a calendar year and what we call an irrigating year or irrigation season. I think there is never any time limit in the decrees, but I think the general irrigation season is considered from April 1st to November 1st, and after that, it is winter irrigation. The winter, or non-irrigating season, would be from November 1st. I think October is usually storage season; they usually begin storing in October. The storage season, as far as they can get water

to run, is really the non-irrigating season. We have two seasons when we use all of the water,—the season of direct irrigation, and of storage. I think (256) the non-irrigating season or storage season quits in October. There is very little direct irrigation in October.

Recross-examination.

By Mr. William R. Kelly:

I irrigate the John Zimmerman estate myself. It is located forty-five miles up from Fort Collins, in the Cache la Poudre canon, at an altitude of seventy-six hundred. I would not know why the irrigating season we have would be very much different from that in the valley and around Greeley.

[fol. 224] We raise all sorts of garden produce and hay. Hay is a commercial crop. We have about two hundred acres of wild hay. We (257) do not raise any sugar beets, or potatoes for market—no produce, just hay.

We could irrigate as early as they do where they raise sugar beets, grain and beans. I do not know what their irrigation season is down there. They irrigate in the winter if they want to. I do not believe that question has been determined; I believe that is a matter before the courts right now.

The water could discharge much lower down the stream if it were a reservoir and came within the boundary of the reservoir than it does by the West Side Collection Ditch being brought up to the mouth of the tunnel. This work would not elevate the entire West Side Collection Ditch above that part which is immediately opposite the tunnel.

Redirect examination.

By Mr. James A. Greenwood:

(258) My opinion is that the new plan of construction resulted in the lowering of the elevation of certain portions of the ditch, although I do not know. I have not examined it close enough to know, but obviously it looked quite a bit lower, but of course, I do not know. The water came in very much more rapidly over the lower end than it did higher up. That would indicate a considerable fall—and observing the rapidity of the water flow.

(114) JAMES P. OLSON, a witness in behalf of complainant:

Direct examination.

By Mr. Richard J. Jackson:

I am sixty-seven years old and reside at Fox Park, and have lived around Laramie about forty-five years.

They started to work on the Sand Creek Ditch in 1901; I started in 1902. The Sand Creek Ditch is on the head of Sand Creek. The purpose of that ditch was to take the [fol. 225] water down to Sheep Creek (115) and over to Eaton's. I started to work on the Sand Creek Ditch on the 10th of March, 1902, and worked from the 10th of March until the first of June. It was not finished when I went up there to work. There was no water in it. I was there when they finished it. They first ran water through that ditch about the middle of May, 1902. There had never been any water run through the ditch before that time.

I worked up there on the Sand Creek Ditch until the first of June, and then I went up to Deadman and built a camp. Bill Pixler was the foreman on the Sand Creek Ditch. On or about the first of June, I went with him and other men up to Deadman. We worked up there— (116) we were cutting a trail from the old camp to Deadman.

I know Worster. He blazed a trail up there. After we got up there, we built the cabins on Deadman and then started to cleaning the timber out. After we got the timber cleaned out, I quit. There was no ditch there at that time. I have never been back there since.

I kept a book or diary of the time I went to work on the Sand Creek Ditch. It shows the date when I went to work up there as the 10th of March, 1902. The diary was made at that time—I made it (117) from day to day up there.

(Complainant's Exhibit No. 2 marked for identification.)
(Photostatic copy of pages from book or diary.)

(118) The handwriting in the memorandum, which is marked "Complainant's Exhibit No. 2," is my writing. I want to keep the book.

(Complainant's Exhibit No. 2 offered in evidence.)

I saw Abe Worster up there when I was working there.

Cross-examination.

By Mr. C. D. Todd:

I went to work on the Divide Ditch on March 10th, 1902. It was pretty near done at that time and was finished in two and a half months. We turned the water in about the [fol. 226] middle of May. It was necessary to do a few days' work along on the banks after the water was running. The ditch was entirely finished, including all of the trimming up, a few days after the water was turned in. The ditch (119) carried water while I was working there. It carried water alright down to Sheep Creek.

I then went up on Deadman Creek and built the new camp. We started to clean the timber out for several miles beyond Sand Creek up on Deadman—I do not know how far. The camp was up on the top of the hill, near Deadman Creek. It was not down on Sand Creek. There was not two or three camps up there then; there might be now. There was only one camp while I was there. As to whether I went clear up to Columbine Creek to see—I have not been up there since; it is several years since I was up there—I don't know.

(120) I worked from about the first of June, when we moved up there to Deadman, until the 21st of June, when I went down to Laramie. Any part of this book after the 21st of June does not pertain to that work.

Redirect examination.

By Mr. Richard J. Jackson:

There was no camp up there at Deadman when I first went up there. I helped to build it.

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(121) Henry Willis, a witness in behalf of complainant:

Direct examination.

By Mr. James A. Greenwood:

I live on Sand Creek in Albany County, State of Wyoming. I work for ranchers. I had a place of my own, but sold it. I am now working for Hunziker Brothers, where

I have been for two years. They are ranchers on Sand Creek. Prior to that time, I worked for Mr. G. R. Holcomb. I have been employed by the ranchers on Sand Creek (122) for the last fourteen years, doing riding, irrigating and general ranch work—just a general ranch hand, riding [fol. 227] for stock and irrigating by the diversion and application of water over the lands. I have irrigated hay meadows mostly.

During part of those fourteen years, I worked for Mr. Goetz for thirteen months. It was in 1922 and the spring of 1923. I irrigated for Mr. Goetz that year. Most of my irrigation was done for Mr. Holcomb. I irrigated last year on the same place. It did not belong to Mr. Holcomb. (123) I have irrigated on Sand Creek for several years prior to 1932—probably ten years. I know something about the supply of water that is available for irrigating on Sand Creek ranches. I had plenty of water all last spring, the first of April, before any of the other ranchers got any of it. I started to water down there the first day of April on what is known as the old Collins place. Water got low there in about twenty days after the first of April—around the first of May, and Mr. Goetz had to have water.

About the first of June is the noticeable time in the season when water gets low for irrigation. That is because the water is applied to some other use. It is taken from Sand Creek through what I call the Sheep Creek Ditch. That is the same ditch that is (124) called the Divide Ditch and the Eaton Ditch, and sometimes, the Sand Creek Ditch.

I have been to the headgates and diversion gates of the Divide Ditch and know what kind of construction they are made of. The installation, or diversion works, is capable of diverting the entire stream of Sand Creek when it is shut down for that purpose. I have seen that situation several years. That is what I refer to now as the use of water which causes our shortage.

I was not on Sand Creek prior to 1902 and do not know anything about conditions then. I know something about the water-shed on Sand Creek above and below the diversion gate of Divide Ditch. I (125) gather cattle up there [fol. 228] every year. There is considerable late water available for Sand Creek from the higher reaches of the creek.

Sometimes during the year, Sand Creek becomes a dry creek bed. Last year there wasn't any water below the diversion.

When I said it becomes dry, I mean below the diversion gate; above the diversion gate, there is always water in Sand Creek. That water is taken from both Deadman and Sand Creek. Both contribute and are such streams as furnish a late water supply from the upper reaches.

I heard the testimony in regard to how the water is applied, diverting it from the stream and flooding the hay meadows—that is the way I do it. In doing that, our diversions are regulated or kept within the amount of the appropriation—we have a headgate there.

(126) I do not know the amount that either of the ditches are entitled to divert from the headgates where I irrigate. The water commissioner has, at different times, inspected those diversions. After the first of June, there is not available in Sand Creek, below the Divide diversion works, sufficient water to supply the demands for irrigation on the various ranches. That is a common situation year after year. I do not know the ratio of the water that is taken through the Divide Ditch from Sand Creek, as to which is Deadman water and which is Sand Creek water, but I do know that it is composed of both.

Cross-examination.

By Mr. C. D. Todd:

I use both Collins ditches on the Holcomb ranch. I believe I have heard one of them called the Collins No. 4 at one time, (127) and the other is just the Collins Ditch. I do not know the amount of the Collins Ditch No. 4.

I should judge that about one hundred acres of land are irrigated from Collins Ditch No. 4 on the Holcomb ranch, if I am not mistaken. There are two meadows there. The [fol. 229] ditch goes into what we call Running Water and then crosses to the north meadow of the Collins place. We irrigated more than twenty-six acres of land on that ditch with the flood water we had. Referring to the Collins Ditch proper, that would mean the larger ditch that goes into Running Water, but which is which, I do not know. I know they are both Collins ditches. I should judge I irrigated about one hundred ten acres with both ditches.

(128) We had no measurements or means of knowing how much we diverted through either one of these ditches at the same time. We never had enough to turn in five feet. At times, we had enough to turn in more than .37 of a foot, but very seldom. We had no measuring weirs on our ditches; we never measured—just took what we could get. We just opened the headgates and used water as long as we could. Most generally, we started in the spring, about the first of May. Last year, I turned it in the first of April, and we continue to use it until about the 10th of July, if there is enough water. It does not always run continously as long as there is water. We always take it off for a short time and turn it in on some other part of the meadow.

We did not always have our appropriation. I could not say whether, when we did have it, that we used more than the usual footage shown here, because we did not have any way of measuring it.

(129) We turned the water over the meadows—that is the customary way on all these ranches I was working on, at all times. In flooding steadily, a part of the water would go back immediately to the stream from the flow through the low spots in the land. I could not tell how much of it would go back. The soil I was irrigating was sandy underneath. There would not be very much return water to the river through seepage that runs down to the river. Those lands were right up against the creek.

[fol. 230] I am familiar with what is called the Deadman portion of the Wilson Supply Ditch—that is, that runs from Sand Creek up and connects with Deadman and beyond. I have seen the ditch and the water running in it. There is always some Sand Creek water coming (130) down above the dam, and there is Deadman water coming down, also. I have no means of segregating and knowing the appropriations. As to my knowledge that it was not all Deadman water, naturally the dam below there, at the Divide Ditch, at the head of Divide Ditch below the dam, would be dry. A person could see there was more water coming in from Sand Creek than there was from Deadman Ditch. I have seen the water running into Deadman Ditch for several years. I could not say how long it runs there. The month of May is the heaviest run-off usually. In June there would be quite a bit of water coming down, and some in July.

The headgate of the Collins Ditches that I have been using is above the headgate of the Goetz Ditches. I mean farther up toward the state line. The first ditch takes out just about a mile (131) below the state line. I should judge it is twelve or fourteen miles from the state line up to the Divide dam. There is three small creeks that supply very little water, which are tributaries to Sand Creek between the Divide dam and the Collins headgates. The only return water into Sand Creek itself that accumulates in that twelve or fourteen miles is what little comes off the Wurl meadows. All of the seepage water that comes off of his meadow returns into the creek there.

Redirect examination.

By Mr. James A. Greenwood:

The distance from our ditch to the Divide headgate is close to twelve or fourteen miles.

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(132) GEORGE WIDMAN, a witness in behalf of complainant:

Direct examination.

By Mr. Richard J. Jackson:

I live about fourteen or seventeen miles west of Laramie. I was employed as Water Commissioner for Districts four and five, which embraces what is known as Sand Creek, [fol. 231] during the years 1922 to 1930. I have been called upon from time to time to administer the waters of Sand Creek. My first visit was made to Sand Creek June 13th, 1927. At that time, I went to the Eaton Reservoir—the ditch, the Eaton Ditch.

I found the condition there to be—we estimated about twelve second feet going down the Eaton Ditch—that is, the Sand Creek; (133) and we saw Mr. Eaton at the reservoir. There was about twelve second feet going down Sand Creek below the point where the Eaton Ditch outlet is located. There was some water going down the Eaton Ditch which I did not measure. I talked to Mr. Eaton, Rex Eaton, I think his name is, and the Water Commissioner from that district in Colorado. After that, I went down Sand Creek and stopped at the Lundquist place and closed

the Lundquist headgates to satisfy prior rights below the Lundquist ditches, because there wasn't enough water in the river to satisfy all of the appropriators. I did not go up on Sand Creek again that year.

The next time I was called up there was June 2nd, 1928. I went to the Eaton Reservoir. We went to the Sand Creek headgates—I mean, where the ditch comes down from Sand Creek into the reservoir; (134) Sand Creek was shut up tight. There was no water coming down below the headgate. All of the water was running down the Eaton or the Divide Ditch. I read the gauge on the ditch, which was 1.6. I did not have any rating table; I do not know what that would indicate. I called up Mr. Eaton at, I believe, Greeley, and asked him if he would not turn some water down for the water users in Wyoming, and he said he would turn some water down. I do not know whether any water was turned down after that. I did not go back there again that summer.

The next time I went up to Sand Creek was June 24th, 1929. The water users in Wyoming asked that I go up there and see if I could get some water turned down for them, which was the same reason I went up in 1928. On June 24th, 1929, I found no water coming down Sand Creek [fol. 232] because the gates were closed. I mean that there was (135) no water coming down Sand Creek below the diversion of the Eaton or Divide Ditch. It was dry there. All the water in the river was going into the Eaton Ditch—that is, the reservoir. I did not measure the quantity of water that was going in there at that time. I estimated it as about eight feet. There was about eight feet down farther at the Lundquist Ditch. We stopped there, and there was about eight second feet there—that is an estimate. I did not estimate or measure the amount of water that was going in the Eaton Ditch. On that occasion, as always, I tried to see if I could get hold of this man Eaton to see if he would turn some water down the creek. I do not know (136) whether or not he turned water down, as I did not go up there again that summer.

I believe the next time I had occasion to go up to that point on Sand Creek was June 12th, 1930. I went up there at that time to see if we could get some water for the Wyoming appropriators, as there had been a complaint made that there was not sufficient water. I went to this same

point of diversion of Sand Creek and the Eaton Ditch. We estimated about two second feet going through the gate down the creek and the rest of the water in Sand Creek was going down the Eaton Ditch. I was to see Mr. Bishop, or call him up, or something, and see about the people in Colorado taking the water before these Wyoming people—that is the record I have here. I do not know as I done anything then. I called up Mr. Bishop, or got hold of him some way. I did not have occasion to go up there again that summer.

(137) The next occasion when I went up there was on the 14th day of June. I will take that back—the 23rd day of June, 1930. I did go back up there again that year to Sand Creek. Mr. Bishop superintendent of Water Division No. 1, and Mr. Floyd Roush, who is connected with the State Engineer's office, came over there and wanted to go to this Sand Creek, the head of Sand Creek, I supposed to find [fol. 233] out about the shortage of water down below. Mr. John Goetz, who testified this morning, was also along at that time.

We went up to the diversion of the Eaton Ditch from Sand Creek and found there was about ten second feet coming down Sand Creek, which was diverted somewhere in Colorado, just across the line from Wyoming. It was not diverted through this Eaton Ditch; the water coming down Sand Creek would not be diverted there. There was water (138) being diverted on that date through the Eaton Ditch, estimated as about ten second feet. There was eight feet in the ditch and ten feet coming down Sand Creek. No, there was not only two feet going down the creek beyond the diversion. You do not understand me, sir. They were letting ten second feet go down the creek below the diversion.

We went over to Glendevey and seen Mr. Drummond, who was the water gauger or hydrographer, about diverting water. I did not have any other occasion to go up to Sand Creek in the year 1930. I next went up to Sand Creek on June 14th, 1931. At that time, I was deputy water commissioner of that district, and went up there to measure this Divide Ditch.

(139) We did not go to the point where the Eaton Ditch or Divide Ditch goes out of Sand Creek; we just went up to the Divide Ditch, and made a measurement there. I sent

the notes in to Mr. Drummond, or gave the notes to Mr. Drummond. My independent recollection as to the amount of water that was in the ditch at that time is around twenty feet.

The Eaton Ditch diversion is in Colorado and I had no supervision or jurisdiction over the diversion there. As Water Commissioner in that district, I attempted to regulate all appropriations of water in that district and keep all of the appropriators within their appropriations whenever there was occasion so to do, which was when there was a shortage of water. The water was always short whenever I was over to Sand Creek.

[fol. 234] (140) Cross-examination.

By Mr. C. D. Todd:

I believe I went over there once in one year in June, and once twice, and these visits were always during the month of June. That is the only time I ever went over this reservoir—the dam. It was a reservoir—this Eaton reservoir, as I understand it. There was quite a dam there. It is the reservoir that the Eaton Ditch, that comes out of Sand Creek, runs into. It goes through a tunnel into a reservoir a couple of miles on Sheep Creek. That is what I mean when I speak of the reservoir.

(141) I could not say as to whether the small quantity of water above and below the Divide dam was strictly Sand Creek water or whether some of it was water that came from Deadman Creek into Sand Creek.

When I spoke to Mr. Eaton, he said he would turn down a certain amount of water from Sand Creek for the Wyoming appropriators. I suppose he did; he never refused; he just said he would turn some water down.

As to the quantity of water, including Deadman, if any, that was going down their ditch being about ten or twelve or fifteen feet, that was just an estimate. I believe on June 2nd, 1928 there was 1.6 depth on their guage at the weir. I believe the weir is below (142) the tunnel. I don't know about the measurement of the water after it gets over the side of the mountain in Water District No. 3.

I was water commissioner in the district where Sand Creek is from 1922 until 1930. In 1931 I was deputy commissioner. I have been officially connected with the stream

until the other day. I am no longer water commissioner or deputy water commissioner.

Redirect examination.

By Mr. Richard J. Jackson:

Mr. Eaton never refused to promise to turn water down when I talked to him, but I do not know whether he turned it down or not. He might have turned it down one day and [fol. 235] turned it off the next. There did not seem to me there was enough water in Sand Creek below the ditch (143) after June to go down to the prior rights in Wyoming.

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(144) William B. Freeman, a witness in behalf of complainant:

Direct examination.

By Mr. James A. Greenwood:

I now live, and have resided in Denver for twenty-five years. I am in the pipe business at the present time. Previous to engaging in that business, I was engaged in civil and hydraulic engineering. I am a graduate engineer, and licensed to practice in Colorado. I received my first degree in civil engineering in 1903 and have pursued the profession, I think, about sixteen or seventeen years. I think I have been licensed to practice in Colorado ever since the license law was adopted—about twelve or fourteen years; I am not quite sure.

I was the district engineer of the United States Geological Survey, of the Denver District, for five years, from 1907 to (145) 1911, inclusive. During that time, I was engaged in the measuring of streams and compiling stream flow data. I might say that I was engaged in the measurement of stream flow and compilation of data relative to stream flow for a number of years before I graduated from college. I was engaged for about twenty years in that kind of work.

I have made measurements of all kinds of streams, and have made measurements of all kinds of canals. I am quite familiar with all kinds of devices and rules applicable

to the measurement of streams. There are what we call standard measuring devices, gauging devices, weirs and current meters, and so forth. I have worked with all of those, including automatic gauges. I am familiar with automatic gauge charts and the plotting of rating tables and curves.

(146) I am familiar with what is known as the Cache la Poudre Tunnel or the Greeley Tunnel. I was there during its construction and have visited both the east and west [fol. 236] portals. It is the Laramie-Poudre Tunnel, to be correct about it. The west portal is on the Laramie side of the Divide and the east portal is on the Cache la Poudre side. The tunnel is used for the purpose of trans-mountain diversion—that is, to bring some of the water of the Laramie River into the Poudre River. That is what they call a trans-mountain diversion—taking the waters of the Laramie through the tunnel and delivering them into the Cache la Poudre River.

I first visited the location of the tunnel when it was under construction and have known of it ever since it has been there, in a general way. I inspected the east portal of the tunnel on February (147) 14th, 1926. I was employed by Miss Zimmerman, the lady who testified here this morning, to make some observations to note the flow of the water through the tunnel on that date. I was there in my professional capacity, representing her to ascertain the amount of water coming to the Poudre from the Laramie through the tunnel.

I made an estimate at that time; I read and inspected the gauge. They have a staff gauge on the side of the rating flume. I made a memorandum of my findings there at that visit. I have the memorandum that I produced after my inspection. The condition of the automatic register at the time of my visit on February 14th, 1926—that was in the winter time, and the float of the automatic register had been removed because otherwise it would probably freeze in, so they had taken ((148) the float out of the water and the register was not recording. The water was passing through the tunnel unrecorded by the automatic register or by any other device, as far as I know. The gauge was .35 feet, and my estimate of the flow was 9 cubic feet per second going through at that time.

I knew Homer Duvall, who was official gauge reader in that district at that time. I met him up there and he went up with me on February 14th, 1926, the day I read this guage. I discussed with him the question of whether or [fol. 237] not the water had been running through the tunnel.

Q. Unrecorded?

Mr. Kelly: We object to that as hearsay.

Mr. Greenwood: He was the official gauger, he said, at that time.

Mr. Kelly: I also object to the statement that he was the official gauger, because I do not believe it was a fact. He may have been living up there, but I question that he was (149) the official gauger in February 1926.

As to whether he had any official connection with that water district in the reading of the ganges, he was taking care of the gauge. He may not have been the official gauge reader, but he was taking care of the gauge, and he was living in the official house there.

Mr. Kelly: There was no gauge.

The Witness: I beg pardon. The gauge was there, but it was not recording.

Mr. Duvall was looking after the tunnel at that time.

Mr. Kelly: I object to that as hearsay.

I spoke to Mr. Duvall with reference to water being delivered through the tunnel at that time.

Mr. Kelly: We object to that as hearsay.

I asked him if the water had been flowing through the tunnel during the winter, and he said that it had been flowing since——

Mr. Kelly: We object to that as hearsay.

December 13th, 1925, without record.

(150) Mr. Kelly: We moved that the statement be stricken.

I made a further inspection of the tunnel on March 21st, 1926, and found the gates were shut down and there was no water flowing through the tunnel. I made another personal inspection on the 27th of August, 1926. Mr. Ben

F. Powell was with me on that date. A young engineer named G. E. Arnold was with me on my March visit. [fol. 238] I did not go to the east portal of the tunnel on August 27th, 1926; I went to the west portal. I saw the water going into the tunnel, and I estimated the flow at thirty cubic feet per second. That was an estimate, not a gauge reading. From my observations and information I obtained and my knowledge of flow of water in a stream, I estimated that the flow from December 13th to December 31st, 1925, (151) those dates inclusive, was five hundred acre-feet, and from January 1st, 1926, to May 3rd, 1926, inclusive, that the flow was twenty-five hundred acre-feet, making a total of approximately three thousand acre-feet that went through there unrecorded.

I talked to Mr. McAnnely with regard to the operation of the tunnel as to whether a record was kept of the foreign water. Mr. McAnnely was at that time the district engineer of District No. 3. My first conversation with him on that subject was in February 1926. Mr. McAnnely said he had no personal knowledge that any water was going through the tunnel at that time. I asked him what they did with the water which was flowing through the tunnel during the season when it was not recorded, and he said that insofar as he was concerned, it belonged to the Cache la Poudre River and he distributed it the same as any other water in the river—just a general contribution to the stream.

I did not have any further or other conversation with Mr. McAnnely with regard to the stream or the delivery of water through (152) the tunnel to the Cache la Poudre River at that time. I had a conversation with him in May of that year, but he said substantially the same thing. He had no record of it. I do not know Mr. Mosier, the commissioner of District 48.

In determining the estimate of the unrecorded water that passed through between December 13th and May of 1926, besides my own personal observations at the tunnel and my conversations with Mr. Duvall, I consulted the records and the reports of the district engineer, and the division engi- [fol. 239] neer of Division No. 1, and also, the rating tables or rating curves which were applied to the gauge heights. This rating table was on record in the State Engineer's office. I made reference to that in determining my conclusions as to the amount of water that passed through there, and also, consulted the gauge charts during that time.

I saw the gauge charts for 1926—they seemed to be (153) kept in very good condition. I think, insofar as I could tell, the record of the gauge charts were quite accurate—that was my impression of it. The gauge charts did not help me at all in determining the amount of water that I estimated passed through during the off season, because there were no gauge charts on file for that period. I determined that by my own observations as to the flow of the stream, and other data that had been taken by the district engineer or by the hydrographers of the State Engineer's office.

As to what period of time the weekly water reports of the commissioner covered during that period—the official reports of the district engineer to the division engineer terminated on December 12th, 1925, and the official record was resumed on May 4th, 1926. I cannot tell you from this particular record on what date in 1926 the official record ended. I think it was on the 22nd of September, but I haven't that stated here as far as I know. It is a matter of record in the State Engineer's office. The period of time of unrecorded flow was from December 13th, 1925, to May 3rd, 1926, inclusive.

I am familiar with the altitude and the location of the streams around the tunnel—for instance, the Laramie River, and the headwaters of the west branch. The seasonal flow there normally (154) would rise more or less gradually. There might be considerable flow come through that tunnel from the Laramie River between the time of the first thaw in the spring of the year and the date of May [fol. 240] 4th. That is a seasonal matter, as you know.

Q. In fact, probably there would be if the tunnel was in shape to carry water?

Mr. Kelly: We object to the argumentative style of counsel.

Mr. Greenwood: The argument may be stricken.

I have been over there on the Laramie side of the watershed and down through what is called the "Meadows." A casual observation of the conditions over there is about all I ever made. I never made any particular study of the conditions. I would expect considerable variation in the diurnal flow of a stream at that altitude. The (155) temperature would cause that. As you all know, the nights

are very cold at that altitude, so that the water running off would tend to freeze up at night, and during the heat of the day the snow and ice would thaw and the water would run off at a more rapid rate. With that condition prevailing, it would be impossible to measure the water accurately without an automatic gauge which would register the gauge height every minute. In other words, anything less than an automatic device to be on guard every minute would not tend to be accurate under those conditions.

Cross-examination.

By Mr. William R. Kelly:

The observation in February 1926 was made at 3:45 p. m. I could not say whether, at that time of the year, at that altitude, and that length of days, the flow would be at the peak. That would depend a good deal—some days it would be at the highest at that (156) time—you understand that was in the winter time. The sun sets very early in that can-on and it begins cooling off right soon after 3:45.

On that particular day, which was probably a little unusual, the flume was free from ice, and there was no ob- [fol. 241] struction to the flow because of ice; I noted that. I would expect the diurnal flow would be least in the morning and would gain until it got cold again in the late afternoon of a winter day. The highest point I found was nine second feet. It was 0.35 on the gauge. Mr. McAnnely told me it was 11¼ second feet at that gauge height. My own estimate was nine.

That was not the same weir that is there now. In my estimation, that weir was not very accurate. I did not use a current meter; I made that estimate from other current meter measurements. On my visit on the 21st of March, I determined the point of zero flow on the gauge, which was an important point on the rating curve. I was never there again in 1925.

(157) I arrived at the figure of five hundred acre-feet for the eighteen days in December 1925 as follows: the last day shown in the official reports was December 12th, 1925, and at that time the stream was carrying sixteen cubic feet per second according to the official records, and my estimate was made by interpolation pretty much between those two records and the information that had been furnished me.

I figure one cubic foot per second equal to two acre-feet in twenty-four hours. To get five hundred—supposing for instance you had, I will say, 15 second feet flowing continuously; that would be 30 acre-feet per day, you see, and, in seventeen days, that would be 510 acre-feet.

I do not know whether it was flowing 16 cubic feet per second every day in December. I do not know, to my own knowledge, how much it was flowing this day in February, 1926. It might have been more or less than nine. As an engineer, with experience of mountain streams, my assumption would be that it would be less in the morning, but the next morning it might be flowing more than that. From my experience as an engineer with mountain ditches and streams, I would (158) expect a gradual decrease in the flow from the forepart of December to the end of [fol. 242] December.

I was not there at all in December 1925. I was there on March 21st, 1926, and determined the point of zero flow on the gauge, which was the point on a rating curve which I substantially made.

I do not know of my own personal knowledge that there was any water running through there the first day of March 1926—only what Homer Duvall told me. My only knowledge of the official position held by Homer Duvall was that he told me he was taking care of the gauge. There was a gauge there, but the float on the gauge had been raised out of the water. He was not taking care of it, in a sense, perhaps, of reading the gauge, but he was, in a sense—he was looking after the gauge, seeing that nobody stole it, or something of that kind. He was living there in the house below the tunnel; and as to his employment, I only know what he told me.

I did not go through the tunnel in February 1926, or in (159) March 1926. I have not been through the tunnel since February 1926. I do not know how much water was coming in at the tunnel at the west end on those days, except I know that most or substantially all of the water that enters one end comes out the other. I was practically through the tunnel when it was under construction; I have never been through it since water has been running through it. I do not know how much water the tunnel gains in its course through the mountain. It is approximately three miles long.

I am confident that that water, or some part of it, was not water that came into the tunnel through its walls from leaks and streams and water supplies upon that day; it would be an amazing thing if it did. I could not say that no part of the water that comes out of the east end of that tunnel comes from anywhere except the Laramie River, but I am willing to say it is mostly Laramie water; I (160) never took any measurements to determine that point. I do not pretend to say that that water does not gain from seepage or from other sources. I do not make [fol. 243] any such statements. I only know, as I have previously testified, as to how much water came out of the tunnel in January 1926, which is based upon the measurements I made at 3:45 in the afternoon in the middle of February. I know that on March 21st there was no water coming out.

I based my estimate on the deduction that the amount of water was constantly declining from December to February; I made an average, you might say, between those two dates. As to how much water was running through it in April 1926, I have the record of the chart from March 24th to April 4th, inclusive, and then I have some readings that were taken at the end of April from the automatic register. I am able to get those records, but some of them are not official records.

I don't know whether or not that water was charged up by the river commissioner of the Poud[illegible] River to the Laramie-Poudre Company, or Greeley-Poudre system; I know what the water commissioner told me, (161) that it was not charged up. I do not know what he did at the end of the year; that is a conversation I had with him that spring.

When the tunnel was being constructed, I was over there representing the Geological Survey in the matter of rights-of-way for that system. As I understand it, the rights of what is known as the tunnel system comprised the right-of-way for the tunnel through the public domain, and also, for the reservoir which they were constructing a short distance below the west portal of the tunnel. I think the idea was that this reservoir would store a certain amount of water which would then be diverted into the tunnel. It was not for the collecting ditches, also. I did not report on the right-of-way for the collecting ditches. I knew they were being constructed, but my recollection is somewhat

hazy as to whether one was on the west side and one on the east side. A large force of men was constructing them on the Laramie River side, at the same time the tunnel was being constructed.

(162) I have been over there fishing a number of times since 1926. As to whether these ditches are constructed [fol. 244] now about where they were then, as I recall, one of the ditches was extended there in 1930 or 1931. It is my impression that that extension work began in 1930, but I might be wrong about that.

I was never over the right-of-way of that west side ditch at the time the tunnel was being constructed. I do not know anything about whether it is being built on a different line or not. I don't know whether the work in 1930 was really completion work or not; I was over there on a fishing trip, as I recall it, and I just looked at it as we passed by.

I venture to say that the altitude of the west portal of the tunnel is something over nine thousand. They have a bench mark at one end, but I do not remember what the elevation is. The water which comes down from the west side, comes from elevations of a thousand or more feet up to probably twelve or thirteen thousand. (163) It is very cold up there at that altitude, the days are short and chilly in the winter time, and it is slow to thaw.

I do not know how much would be the range of fluctuation of that flow of water on a winter day in February at the west portal of the tunnel during the twenty-four hours of the day; on very cold days, there might be a considerable range. If it stopped completely, it would be simply held back and then come down later with a rush. It might be held back by being frozen into ice some time, but our experience with these streams is that if they are frozen up on very cold days, they are dammed back, and when the weather gets warmer, a considerable amount of water comes down. It is like being impounded, exactly.

The other time I estimated the flow at the west portal was on August 27th, 1926. I did not use any current meter, or any instrument at that time. I did know how much was coming out of the east portal that day, because I asked the gauge reader what the reading of the gauge was that day, as we passed by the east portal. I don't know what it is. I can find out, if you want me to and will give me [fol. 245] (164) a little time to go through this. Of

course, as a matter of fact, the reading of that day is shown in your own records of flow. I have it somewhere, Mr. Kelley, but it will take a few minutes to find it.

The occasion of my being there on August 27th, 1926, was that Mr. Powell and I were looking over a number of the transmountain canals. He had been making some measurements, and I made a trip around with him to look at some of them. I was employed by Miss Zimmerman at that time.

In ascertaining the 500 acre-feet in December 1925, I started with at least 16 second feet on the 13th of December—that is what the stream was flowing, according to the official records on the 12th of December. I had assumed a gradual decline over a period of two months. It was nineteen days at which I arrived at five hundred. As to how many cubic feet per second I assumed flowed through there, I haven't the details of those computations here; but supposing (165) you had 500 acre-feet in nineteen days, it would be over twelve second feet every hour of the twenty-four hours; and if there was a variation of fifty per cent, it would have to be as much as eighteen second feet part of the time in order to reach that.

As to having any figure upon which to base such a high rate of flow to arrive at five hundred, as I told you, Homer Duvall told me it had been running fairly steadily since that date. That is, he told me on February 14th that the water had been running fairly steadily at about the same rate since the 13th of December. That was at the rate of nine cubic feet per second toward the end of the warm part of the day. It is my conclusion that I would discount that some.

As to how I arrived at my rating table by which I got 500 acre-feet from December 13th, 1925, on that date I used the flow shown by the official record, and on February 14th, 1926, my conclusion was that there was 9 second feet [fol. 246] flowing. The official rating table showed there was 11.25 second feet flowing on that day, but I used a lower figure and I arrived at that; I assumed a gradual decrease from the 13th of December to the 14th of February. I do not know what was flowing on the 31st of December; over a period of two months, it (166) would decrease 7 second feet, say approximately, at the rate of three and a half per month, or, for a half month, it would be about 2 second feet. That would depend upon how cold

December was, compared to February. I think all of these gentlemen recognize that that was only an estimate I was making. It might have been less than that; I doubt if it might have been half of that. I think it was a good deal more than half, but it may have been more or less.

I arrived at 2500 acre-feet as having been discharged by the tunnel in 1926, prior to the date of May 3rd, on the same basis. I arrived at 1230 acre-feet from January 1st to February 27th, inclusive,—no discharge from February 28th to March 23rd, 1926—and then, from March 24th to April 3rd, we had actual gauge readings. There was 140 acre-feet from April 4th to April 27th, from actual gauge readings, and we got 770 acre-feet. April 27th to May 3rd, with actual gauge readings, we got 400.

January is usually a colder month than February, and a more wintry month. All of this is based, approximately, upon the assumed flow of nine cubic feet per second throughout the twenty-four hour period in February; but the fact might be that I took it at a time when it would be higher in the day in flow per cubic feet per second than it would be in some other part of the day.

(167) Part of the record that I got up to May of 1926 is on the automatic gauge records in the State Engineer's office, although they were not reported officially. It is recorded, but is not included in the official reports. I found it on the automatic records.

When I referred to the district engineer, I meant the water commissioner of District No. 3.

[fl. 247] The 2500 acre-feet in 1926, about which I have been testifying, was purely an estimate. It was based on—those two observations were the only two I made personally, but we had a lot of other data that supports it. You understand, that from February 28th to March 23rd, I show no flow. On March 24th to April 3rd, I have it 140 acre-feet. On March 24th, the gauge read .33, and it was 7½ second feet.

I cannot tell you whether a measurement made at 3:45 the afternoon of February 13th would or would not give a fair average (168) of the flow of that tunnel for that day, because, as I have previously stated, in many days the flow would be more at that time in the afternoon than it would be at other times of the day; but for that particular day, without looking up the temperature records, I could

not tell you whether that was a fair average or not. The flow would probably be less in the morning than in the latter half of the day due to the cooling off of the air in the night time.

Mr. Kelly: I would like to ask the privilege of cross-examining this witness further at some future time, at some further hearings, if he is to be in Denver.

The Witness: I will be glad to do that; I would prefer not to have to wait at this time.

Mr. Kelly: That is all—either here, or in Denver.

Mr. Greenwood: That is all right; he will be available.

Redirect examination.

By Mr. James A. Greenwood:

It is a fact that my observation of February 14th, 1926, was only one of a number of observations. I took the record of the flow on December 12th, consulted the records in the engineer's office, and had my general knowledge of the possible fluctuation in the flow of a stream in that altitude under those conditions. The flow during (169) the winter months may be pretty much the same. That is exactly what Mr. Duvall told me, that it was running more or less at that rate.

[fol. 248] I am familiar with the west portal of the tunnel. If the mountainside or the recesses of the tunnel were contributing a flow of water, it could all be avoided by measuring at the west portal. It is usual to charge to a diversion all discharge of water that flows through the measuring devices. There might actually be an increase from seepage in that tunnel, or there might actually be a loss; in other words, it may take considerably more Laramie River water to measure out at the east portal of the tunnel than actually goes in.

I do not know whether my observations at 3:45 p. m. would necessarily be the high point. In determining the diurnal (170) fluctuation of the stream, a determining factor would be the distance from the source of the water to the point of measurement. It could be in the middle of the night, or four o'clock in the morning, or three in the afternoon, depending upon when it would arrive.

Recross-examination.

By Mr. William R. Kelly:

I did not take a record of the flow on December 12th; December 12th is the official record—not from some observation of my own.

Redirect examination.

By Mr. James A. Greenwood:

I think the official record disclosed on December 12th, a flow of sixteen second feet.

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(171) Ben F. Powell, a witness in behalf of complainant:

Direct examination.

By Mr. James A. Greenwood:

I reside at Denver, Colorado, and follow the profession of civil engineer. I have been a civil engineer for about twenty years. I am a graduate engineer from the Massachusetts Institute of Technology. I graduated in the year 1923, and have followed the engineering profession both before and since that time. I have been engaged continuously in following that profession since 1923.

[fol. 249] I have been out of the State of Colorado considerably. The latter part of 1926 and 1927, I was in Texas, and the latter part of 1927-1928, and the first part of 1929, I was in West Africa. I (172) spent the majority of my time in hydraulic engineering and irrigation. My work in Africa was entirely different—was geodetic. I have been in Denver since 1930.

I know Miss Agnes Zimmerman. I was employed on the 26th of April, 1926, until the first part of September, by her, taking miscellaneous observations on trans-mountain diversions from the Laramie River, Sand Creek, Grand River and the North Platte. I made some observations of trans-mountain diversions from the Laramie River to the Cache la Poudre River by the Greeley-Poudre Tunnel.

(173) The first observations I made of the flow of the trans-mountain diversion from the Laramie to the Poudre,

via the tunnel, was by gauge readings at the rating flume at the east end of the tunnel on the Poudre side. The first one of those readings was on April 27th, and I think the second was on May 3rd. In a memorandum of my observations, I noted the date, and arrived, from the official rating table later, at the amount of water being discharged.

For April 27th, 1926, I observed a gauge heighth of .7 of a foot. The estimated discharge was about 27 second feet, according to the official rating table which I observed later. On May 3rd, the gauge heighth was .9, and that gave a discharge, to be exact, of 38.6 feet of water, according to the official tables.

(174) As to further measurements from the Greeley-Poudre Tunnel, I have noted in my diary a gauge heighth of .5 of a foot on May 14th. I cannot remember how much the discharge is; I did not note it in my diary. I have it in my rating book. That, apparently, was just a gauge observation. My first rating with a current meter was on June 1st, 1926. I have a rating again on the 2nd of June, the 3rd of June, and the 5th of June, 1926; and that is all of the current meter ratings I have a record of for that year.

[fol. 250] I was really not informed as to the purpose of making those observations for Miss Zimmerman. I was just instructed to take the measurements to ascertain the amount of water through the flue— (175) I did not know the purpose, or the object at that time. I have not since learned, and do not know now. I just performed the duties I was instructed to perform.

On June 1st, there was a gauge heighth of .3, and the discharge was 3.61 cubic feet per second, according to my measurements. On June 2nd, the gauge heighth was .55 of a foot in depth, and the discharge, according to my computations, was 26.04 cubic feet per second. On the 3rd, the gauge heighth was .53, and my computations gave 24.93 cubic feet per second. On June 5th, the gauge heighth was .50, and the computations showed 20.98 cubic feet per second. I have a gauge heighth of .4 of a foot on June 17th. I have no further record in June of any gauge readings on the tunnel.

To the best of my knowledge, there was no register operating when I made my first observation there on April 27th, 1926. (176) I made an inspection to determine

that. I do not remember that there was an automatic register in operation on May 3rd, 1926. From my memory over six years, I was impressed with the fact that the record started May 4th, the day after I made this second inspection.

If there was, on May 3rd, 1926, 38.5 second feet being discharged, I would not think there would be any great increment or increase in the days immediately previous to May 1st. I would say that there must have been a substantial discharge in the days immediately preceding May 3rd to show that reading on that date. In other words, at that time of year, the daily discharge would be inclined to graduate up, commencing at the lower point in the colder days of winter, like February.

I met Mr. McAnnely once, in company with Mr. Freeman; I do not remember the date. I probably have it in my diary—it was in the summer of 1926. I was present [fol. 251] with Mr. Freeman when Mr. Freeman talked to Mr. McAnnely about his method of keeping a record of discharge (177) into the Poudre from the Laramie River, and I remember distinctly that he made the statement that the water delivered to the river, he just distributed. I cannot say definitely that he said whether or not he kept a record of the amount that came in that was delivered to the river. I just remember that the statement we made in writing at the time was a record of the conversation. I think that statement is among the records here somewhere. I have a copy of it, but it is hard to get at.

I did not make, from the readings I made and from the observations of the conditions of the stream and discharge through the tunnel, any estimate of the amount that had possibly passed through without record prior to May 4th, 1926. Mr. Freeman made an estimate for 1925 and 1926, but I did not make any estimate except for the period from April 27th to May 4th, 1926. Between April 27th and May 4th of the year 1926, I estimated somewhere in the neighborhood of three or four hundred acre-feet had passed unrecorded during my period of observation, prior to May 4th.

In observing the flow and attempting to get the just (178) amount on these observations, I found that the gauge was still rising at night, and apparently was higher during the night, sometimes, than it was during the day. The

day's melt arrived at the tunnel after sundown and in the night. In other words, the water that melted on the watershed, or the mountainside, during the period of the day when the heat was the greatest, was arriving at the tunnel in the night time.

Q. Then, if the time of day had any effect upon the diurnal flow or fluctuation, for instance, in February, from the experience you had and your observation, three o'clock in the afternoon might be the low point?

Mr. Kelly: We object to the argument of counsel.
[fol. 252] Mr. Greenwood: I am asking for his conclusions.
Mr. Kelly: It seems to me that the witness might state.

The low point will come some time during the day, before night, and, from my observation, some time about noon. From my knowledge of the fluctuation in the flow of mountain streams, such as the Laramie River, it would not indicate that there would be a wide variation in the winter time in the amount that was flowing as long as it was not exceptionally warm. If the temperature was more or less constant, the flow would be more or less constant, barring ice jams or unforeseen conditions one way or the other in the stream.

(179) Cross-examination.

By Mr. William R. Kelly:

I was employed by Miss Zimmerman after interviewing Mr. Freeman. I was apparently under Mr. Freeman's directions as to technical matters. I had no understanding of the nature of the project on which I was engaged.

The 27th of April, 1926, is the date of my first recorded observation. I do not remember making an observation of the discharge of the Laramie-Poudre Tunnel prior to that time. It is not recorded in my diary. In the fall of 1926 and early 1927, I was in Texas. I think I have one lone observation in August of .4, just a casual observation, and .45 on July 13th; I think that was my last observation of the tunnel. It was about noon that I took the measurement on April 27th and on May 3rd, 1926. It was apparently exactly noon when I made my observation on May 14th;

I have it noted at noon. (180) I did not note the time of day when I made the rating on June 1st, but it was approximately noon. It was approximately the same time on June 2nd, 3rd, 5th and 17th; the reading in August was in the late afternoon. I do not know that you would call April a warm weather month at that altitude; it is warmer than February.

[fol. 253] I have made trips in there in the winter. I have made nothing except a casual observation of the discharge of the Laramie-Poudre Tunnel in the winter. I made a casual observation, I believe, in March, 1921; it was in 1913 when I saw the west end of the tunnel. (181) I cannot tell you how much water was coming through; I did not visit the flume. I did not make any observations up there in the months of April, May and June, 1926, other than about noon or afternoon, and not more than one observation a day. I do not know how much water was flowing there at five o'clock in the morning, or nine o'clock in the evening on any of those days; my estimate is based on official records that followed May 4th, which were a continuation.

The nights, as well as the days, in the warmer months, are warmer than in the winter. We do not generally expect thawing of snow and ice at altitudes of eight to ten thousand feet in the night time in this latitude. I would not expect snow to be thawing on the Laramie River at the west portal of the Greeley-Poudre Tunnel in the night time in the months of December, January, February, or March; (182) there might be thawing in the night time in June at the west end of the tunnel. I would not say that a small stream like that might freeze up completely in the night time at that altitude; streams of that type would not.

I did not go through the tunnel and do not know what accretion there is in it, if any. I have seen the east portal practically dry, except for perhaps a miner's inch. I cannot quote that date, but I have seen the rating flume dry—no flow except a miner's inch; but I cannot tell you the date. I have seen it dry without ice. It was in October, I think, in the fall; but I have seen the flume dry. I would not want to say what year it was.

I have observed the Poudre River numbers of times during the winter, and have observed there is very little fluctuation (183) during the winter. I made my obser- [fol. 254] vation at Home, and above there, on the Poudre itself, which is below the tunnel, and which is within two miles of the outlet of the tunnel. I have made no observation of the discharge of the tunnel, except at noon on these various dates I have given. I do not know whether it would be less or more six hours prior or six hours after that hour.

Mr. Kelly: I would like the privilege of examining this engineer at length at some later time, the same as we have reserved the examination of the other gentleman.

Mr. Greenwood: I think that is all right, if you will assume the responsibility of contacting him.

Mr. Kelly: Very well.

Redirect examination.

By Mr. James A. Greenwood:

I made observations of the discharge of the tunnel in the summer and found that the high point of flow was in the night time.

Mr. Kelly: I did not understand him that way; he said he had observed it except at nights.

The Witness: I had observed the run-off of these watersheds, particularly, and the Skyline Ditch got higher after night. The same (184) thing applies to the tunnel. The source of the Skyline Ditch water and the tunnel water is practically the same.

Recross-examination.

By Mr. William R. Kelly:

The observation about which I have just testified, was made in the summer of 1926. I think I can tell you the date—it was apparently on the 28th of May. I was at the rating flume of the Skyline Ditch when I made the observation, which would be just at the Divide. I was right on the west branch of the Laramie River at that time, where the Skyline Ditch takes out. I did not get to the headgate of the Skyline Ditch and do not know whether it was taking all of the water of the river or not.

[fol. 255] As I remember, it is about six miles from that headgate down to where the tunnel diverts from the river. There would be a substantial accretion to the river from the mountain sides and small streams and small watersheds up to the Skyline Ditch, between those two points at that time of the year. I am quoting from memory—that (185) there is six miles of distance in there; I knew exactly what it was at one time. If there was only one mile of distance, the accretion would not be proportionately less; it would not be a straight line.

The Skyline does not take all of the water there is at its headgate; it accumulates a lot of it off the side of the mountain. Assuming that the Skyline does take all of the water that there is in the river at its headgate, the accretion between the two points with one mile as compared to six would be 1/36th of the amount showing up at the headgate; just from observation, it would increase in about that proportion.

The Skyline gathers all along its course along the mountainside and taps one west branch of the Laramie River—I do not remember the name of it. The tunnel at that time was only getting the amount left in the stream, plus the increment on the way down from (186) the water-shed. I do not see that there would be any difference in the fluctuations of the tunnel and the Skyline Ditch.

Redirect examination.

By Mr. James A. Greenwood:

At that time of the late spring or early summer, having in mind the location of the source of water to the tunnel from the Laramie River and the west branch below the diversion point of the Skyline, there is a considerable area there that might possibly contribute more water because of lower altitude. The development of flow might even be greater for the tunnel than for the Skyline, depending upon snow conditions.

[fol. 256] Recross-examination.

By Mr. William R. Kelly:

If I remember rightly, I saw, I imagine, a foot of snow in the altitude below the Skyline headgate down to the tun-

nel headgate on the 28th of May, 1926. It was not uniform all over the (187) ground; it was in drifts. As to what portion of the ground, in percentage of the ground, was covered by those drifts in that area—it seems to me I snowshoed from Chambers Lake over there that day. I did not go to the west portal of the tunnel; it was the east portal I visited. I would say there was snow at the west portal that day from the amount of snow I encountered at that point; there must have been snow reaching down almost to the west portal of the tunnel. That is my opinion, based upon my observation in there under my employment.

Whereupon, præcipe for subpœna duces tecum having been filed with the Commissioner, and said subpœna having been issued for M. C. Hinderlider and duly filed, with the return thereon, the following proceedings were had:

Mr. Howell: It is hereby stipulated and agreed by counsel for the parties herein, that the records of the office of M. C. Hinderlider, State Engineer of the State of Colorado, for which (188) subpœna duces tecum has issued, are to be brought here upon the understanding that said records are not to become exhibits in this case, but are to be retained at all times in the custody and control of said State Engineer of Colorado, M. C. Hinderlider, and that any such records which complainant may desire to use as evidence, are merely to be identified and the originals immediately returned to the custody of said State Engineer of Colorado, and copies thereafter to be supplied by complainant for the records.

[fol. 257] (189) (Complainant's Exhibit No. 3 marked for identification.)

(Water Commissioner's Ditch Report, Water District No. 48, for the year 1926.)

Mr. Greenwood: I offer in evidence Exhibit No. 3, for the purpose of showing the amount of water in the Greeley-Poudre Tunnel in 1926, as indicated by second line 10 of Page 1 of the exhibit, as showing the amount of water diverted in 1926 from March 1st to October 1st, being 590,120,320 cubic feet for direct irrigation of District No. 3, and as coming from District 48. This is offered as being a true and correct copy of the commissioner's annual ditch and reservoir report of Water District 48, Irrigation Di-

vision No. 1, for the year 1926 as the same appears in the official records in the office of the State Engineer of the State of Colorado.

Mr. Howell: The defense objects to the introduction in evidence of Complainant's Exhibit No. 3 for the reason that it (190) shows on its face that it is made from estimates and only partial readings, and as hearsay, and is incomplete, and it is not based upon daily measurements or other reliable data as required by law, and it is not the record required to be kept under the laws of the State of Colorado, and is not an original record of the office of the State Engineer of Colorado, and as being imcompetent, irrelevant and immaterial.

(189) (Complainant's Exhibit No. 4 marked for identification.)

(Photostatic copy of articles of incorporation of The Laramie-Poudre Irrigation Company.)

[fols. 258-262] Complainant's Exhibit No. 4 omitted. Printed side page 1354 Post.

[fols. 263 & 264] (191) Mr. Greenwoood: I offer in evidence at this time Complainant's Exhibit No. 4, being a photostatic copy of the articles of incorporation of The Laramie-Poudre Irrigation Company, being copy of articles of incorporation bearing date of August 1st, 1923, and as filed in the office of the Secretary of State of the State of Colorado on August 4th, 1923, at 11:15 o'clock A. M., in book 224, page 33. The offer is made for the purpose of showing the intent on behalf of the defendant, and parties claiming rights under the defendant, to divert and use the waters of the Laramie River and tributaries and through trans-mountain diversion diverting and using the waters of the Laramie River and tributaries.

Mr. Howell: We object to the receipt in evidence of the exhibit, for the reason that it is incompetent, irrelevant and immaterial, and does not tend to prove or disprove any issue in this case.

(189) (Complainant's Exhibit No. 5 marked for identification.)

(Certified copy of statement of claim to water right, Irrigation Division No. 1, District No. 48, consisting of claim on behalf of Phillip Wilson, the owner of the Wilson Sup-

ply Ditch, and blue prints attached thereto as a part of said exhibit, showing the geographic location of the ditch.)

Complainant's Exhibit No. 5 omitted. Printed side page 1363 post.

[fol. 265] (192) Mr. Greenwood: We now offer in evidence Complainant's Exhibit No. 5, which is a certified copy of the statement of claim of water right by one Phillip Wilson for the Wilson Supply Ditch, which consists of a statement, and a blue print attached thereto as a part thereof, and as certified to over the signature of State Engineer M. C. Hinderlider of the State of Colorado, as filed in the office of the State Engineer on the 23rd day of July 1897. This is offered for the purpose of identifying the Wilson Supply Ditch, and of what it consists, and its location.

Mr. Howell: We have no objection to that.

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(193) Goyne Drummond, a witness in behalf of complainant:

Direct examination.

By Mr. James A. Greenwood:

My home is at Riverton, Wyoming, where I have lived since 1906. From 1884 until 1894, I lived at Wheatland, Wyoming. From 1894 to 1906, I lived at various places in the State of Wyoming—part of the time at Cheyenne. I have lived in this state since 1884, and have pur- (194) sued the profession of civil engineering during all of that time.

[fol. 266] I am a graduate civil engineer from Northern Ohio University, graduating in 1883, and have been pursuing that profession up to the present time. After my graduation, I first engaged in my profession as assistant engineer in driving the Wyoming Development tunnel, and the location and construction of their canals for the purpose of diverting water from the Laramie River for irrigation. I was engaged there until 1885, working for the Wyoming Development Company for about three years.

After that, I did general survey work, locating ditches—performing those duties that come along in the general

practice of (195) my profession. I was on subdivision work in 1898 and had a contract for subdividing nineteen townships for the Government, and was with the Union Cattle Company in locating their canals. I was employed by the Government in subdividing those nineteen townships in Wyoming. I was also with the Government in 1902, with the Topographic Division, and was with them two years; and then I was with the Reclamation Service for two years. During that time, I located the damsite for the Huntley Project in Montana and made a preliminary survey for their canal. That is an irrigation project.

From there I was in Arizona with the Government on topographic work, and located the Laguna Dam, and made a survey for a canal from the Laguna Dam to the foot of the bench just above Yuma. I ran two levee lines a mile apart from the Laguna Dam to Yuma. Then I made a preliminary survey for the Reclamation people at Riverton to determine the amount of irrigable land and the storage supply for that canal. I was working at that time for the Bureau of Reclamation.

(196) In connection with my various experiences as a civil engineer, I have become acquainted with the method of measuring stream flow, my first experience being the establishing of gauging stations for the Government on the Colorado River, about fifteen miles above the location of the Laguna Dam. Since 1904, I have been measuring [fol. 267] canals almost yearly. I have been engaged, more or less constantly since 1904, in that aspect of civil engineering which involves the measurement of stream flows through canals, ditches and streams. I am accustomed to the method of making actual measurements and have made measurements of stream flows. I know the various character of instruments and devices that are necessary for that purpose and the method of using them.

(197) I am familiar with gauge charts, automatic registers and current meter ratings. I have been familiar with the charts for only about four or five years immediately last past. I became familiar with the automatic gauge chart register for the Government, for the Geological Survey of the United States, commencing in 1929.

I have been employed in the service of the State of Wyoming for about eight years as a civil engineer, four years of which I was with the Highway Department, on location and construction of roads (198) and highways for the

state. The other four years employment for the state was with the state engineering department. I was employed by the State Engineer in 1928, first, to make measurements of the trans-mountain diversions in Colorado from the Laramie River and its tributaries to the Cache la Poudre.

Under my employment, I only made two observations of the trans-mountain diversions from the Laramie River to the Poudre River in the early spring, I think, the forepart of April. The only thing that I did then was snow-shoe to the Skyline Canal and see whether or not they were operating it. I found a channel about two feet wide, cutting through about the middle of the canal, as near as I could tell—a (199) channel cut through the snow down to the bottom of the ditch. I presume you would term it opening up the canal for spring flow. There was very little water flowing at that time, and as I observed, there was no record being made of that delivery of water.

From my experience, in a stream of that kind being opened up at that altitude, the flow would gradually in-[fol. 268] crease from a more or less small quantity, to the peak flow in the later summer months.

I did not return again to that Skyline Ditch in that year. I made one trip to the Columbine, which is up on the hill, later in the season. I found very little water running there—just what you might term seepage water.

(200) Columbine Creek is a tributary to Nunn Creek, and Nunn Creek is a tributary to Deadman, a natural tributary to the Laramie River. I do not know what it is called from the junction where Deadman comes in, but it is only a short distance to the junction or confluence of those two streams until it empties into the Laramie River.

When I made that inspection, I did not get clear back over the ditch to see whether the spillways were open or not; there was too much snow in there. You could not see anything of the ditch for the snow.

I visited that ditch at a later time. I returned to the Skyline and other trans-mountain diversions in April, 1929. I was back on the tunnel in April, and was at the Skyline May 22nd and made a (201) measurement there at that time. Refreshing my recollection from my notes, the first visit was made on July 11th, 1929. I visited, with Mr. Meeker, the east and west portals of the tunnel on July 11th, 1929. I took measurements of water at both the east

and west portals of the tunnel on that day. I made a current meter reading at the west portal or intake of the tunnel.

(202) Mr. Meeker made a measurement of 15.82 second feet. I checked him on that measurement, and my measurement made 15.54 second feet. Both of these measurements were made at the same time and at the same point when I was present.

On that same date, I made a measurement at the east portal, or the discharge point, of the tunnel. I got a gauge height of .7, with a discharge of 15.19 second feet. I measured the west portal first and went direct to the east portal. It must have been an hour that elapsed between [fol. 269] our west portal measurements and our east portal measurement. I do not drive very fast and it may have taken me an hour to have gotten over there and climb that hill.

I determined the difference in volume between my west portal measurement and my east portal measurement on that date, to be .35 of a second foot, which was the difference between what it showed (203) at the intake and the outlet of the tunnel. You must remember that one measuring might go in and measure at the same point and not check it within six inches. My measurement showed the discharge point to be .35 of a second foot less than at the intake. We determined that to determine whether there was any loss or gain in the tunnel.

My readings of stream flow have been accepted as satisfactory by the United States Government.

I visited the Greeley-Poudre Tunnel when there was no water going through. I visited it about a month ago, and then I visited it several different times when the gates were closed, when there was practically no water—no more than what would practically seep through a gate. I visited the west portal and found it closed, with probably a half second foot seeping through. I think I visited the east portal (204) at the same time; I think I drove from the west portal right over to the east.

I found at the east portal the same amount of water. There wasn't any increase at the discharge end of the tunnel over what was going through at the west portal, that I could determine. There wasn't enough of it to

permit me to get in there and measure it. The volume was practically the same.

The time I inspected both the west portal and the east portal when the gates were closed and found no water running, was after the irrigating season—that is, they informed me that they were not going to run any more water that season, and I did not find the gate up any more dur- [fol. 270] ing the period I stayed in there that fall. After water had been flowing through the tunnel all during the irrigating season, and then the intake ditch closed, if there was any collection or any seepage water being contributed to the discharge point aside from what was furnished at the intake, it would show at the lower end (205) of the tunnel. There wasn't any increase over what was at the west portal.

It is a difficult proposition to say whether there was a greater discharge from the tunnel than the amount taken in at the west portal at any time. There might have been a loss in there, and there might have been a gain; but if there were, it equalized itself. Our measurements and observations indicated a very slight loss; that might have been in my measurements.

I inspected the discharge point as to the condition of that tunnel in connection with the equipment for accurate measurement of discharge of water. I found the Venturi flume was located in a very peculiar position to get the accurate measurements. By "peculiar location", I mean that it was located at almost a right angle to the outflow of the tunnel, and in my judgment, it would throw the water on the outside of the curve and would pile the water higher on the right side of the flume than it would on the left, and would have a tendency to discharge debris of various kinds in that shorter diameter of the curve—a shorter radius of that curve.

(206) That is my only experience with Venturi flumes. In my experience as to the measurement of streams, the place or location selected to get an accurate measurement should be a direct flow—that is, on the same tangent line, to get as even a current as possible. That is not possible by the location of that Venturi flume, with the right angle discharge. It might be more, or might be less in volume than what the register showed, but, in my judgment, it would be pretty difficult to get an accurate measurement. [fol. 271] I recall being at the east portal of the Greeley-

Poudre Tunnel on July 17th, 1929, to measure the water. There was nobody there in charge of the tunnel when I went there. I saw some one there after I had about two measurements yet to make; I think (207) his name was Loose. I had a conversation with him with regard to my being there. When I turned around—a dog called my attention that some one was there—I turned around and looked back and saw a man standing there, and his face indicated that he was peeved about something; and I went on and completed my measurements and got my instruments to get away from there far enough that the roar of the water would allow us to hear—it was such that you could not hear. I walked away about fifty feet, and I think I was ahead of him, and I stopped and introduced myself and told him who I was and my business in there and by whom sent in, and his reply was to "get the hell off of here and stay off." I told him I was the assistant state engineer of Wyoming. He said he had orders to keep everybody off of there, and I told him I had orders to go on.

I made no further reply to his request that I leave, only, in walking from there down, I told him it wouldn't do him any good to get mad at me. I said, "You are working for your bread and butter, and so am I"; and I got him pretty well cooled down by the time we got down to the house. He called to his wife and said to call the president of the company—I have forgotten his name, and I went on; and he told me, "I will find out whether you can come on here or not." I went on to the car and put my instruments up; and I called (208) Mr. O'Brien that evening and asked him if he had any objection to my measuring the water, and he said "not". I was back there again on the 17th, the same date, and I was back again on the 18th.

I am familiar with a portion of the territory over there on the Laramie River watershed and side of the mountain. I have been up and down the road there and inspected the [fol. 272] stream and am quite familiar with the Laramie River and the various ditches and streams contributing to it. I have made several surveys through there while working for the State Engineer of Wyoming.

I could not get at the automatic register or recording device at the Venturi flume to inspect it, because it was locked. I (209) was never permitted to inspect it. I could not see it at all; there was no glass in the door. Other register-

ing devices had a glass in the door and I was permitted to inspect them whenever the caretaker was there, but I had no access to them except someone was there.

Rawah Creek comes into the Laramie River about six miles down stream, below the intake point of the Greeley-Poudre Tunnel. If permitted to discharge its waters in a natural course, it would not be possible for Rawah Creek water to go into the tunnel. There are several little branches or tributaries located between the point where Rawah Creek discharges into the Laramie River and the tunnel which come down off the mountains on the west side —Rapid Creek flows the greater amount.

I know of the ditch or canal that is now in operation on the west side, known as the Lower West Side Collection Ditch. It was constructed so as to be capable of conveying water during the (210) latter part of 1931. Prior to that time, there was no ditch that interfered with the natural flow of Rawah Creek or Rapid Creek to the Laramie River. The effect of the construction of the West Side Collection Ditch on the disposition of the waters of Rawah Creek and Rapid Creek has been to take all of Rapid Creek, and I do not know how much of Rawah Creek, and carry it into the Laramie River and deposit it about three hundred feet above the tunnel diversion. The greater portion of it is disposed of through the tunnel.

I should judge that the intention of the West Side Collection Ditch was to convey that water to the tunnel; that is what it is used for. I am familiar with the course over [fol. 273] there on which the West Side Collection Ditch was constructed. Prior to 1929, I had observed that there had been construction on a part of it. There was (211) several places back there, probably a mile back, and from there on to a point where it turns directly west about a mile—there was several places along in there where there had been construction work of five or six hundred feet. The construction had the appearance of a completed state. It was not connected up so it could be used for any purpose; it could not have been used to convey water through it for any purpose.

The lower end of the Rawah Ditch leaves the mountain side and comes down across the Laramie Valley for approximately a thousand feet, or a quarter of a mile, and that is where it connects with the Laramie River, two or three hun-

dred feet above the tunnel intake. In examining that thousand feet of construction, in my judgment as an (212) engineer, I would state that it had no appearance of a line ever being surveyed through there prior to when they began clearing the brush off for construction in 1931. It was completed in 1929.

I found some grade stakes on this new portion. I picked them up and observed the station on them. They had been recently placed and had not been of long standing. I was at that location in 1929 when the construction commenced on the West Side Collection Ditch. It was not completed when I left there; they said they would have it completed in about a month. I have seen it since it was completed. (213) The Lost Lake System, consisting of Lost Lake, Laramie Lake and Twin Lake, have no physical connection with the Skyline Canal. The outlet of that lake system is into Chambers Lake. The lake system does not empty into Chambers Lake at the same point that the Skyline delivers water to Chambers Lake. There is no physical connection between the two that I could ever observe. I estimate that they are probably a mile apart. In other words, the only [fol. 274] connection they have that I can see is that they both deliver their waters into Chambers Lake as a receiving reservoir. But the waters delivered from both the Skyline and the Lost Lake System have a common outlet into the Poudre.

I have been up on the mountainside where what we call the Wilson Supply Ditch is constructed and made particular observations of the character of that construction from the year 1929 until 1932, and (214) in 1932. I have been to the point and know where this Wilson Supply Ditch taps the headwaters of Deadman Creek—where it intersects Deadman Creek. There is no headgate in the ditch to direct the stream flow of Deadman Creek through—only the spillway, is all. The spillway is located about a hundred yards almost directly south and just below the cabins; that is, the cabins are above the ditch.

I found water running when I inspected the Deadman or Wilson Supply Ditch. It appears that there had been an automatic register or gauging device installed to determine the amount of flow—the automatic gauge house was there, but it was empty. There was nothing in it and I never found any automatic gauge in operation during my visits.

I never found a gauge staff on the flume. Evidently there (215) never had been any effort to determine the amount of water going through the flume and into Sand Creek, because the caretaker told me when I was making the measurement—he said, "I would like to know how much water is going through there." So I told him if he would keep my notes for me, I would tell him in a few minutes, and I gave him the discharge at that time; and that is the first time he said he ever knew how much water was going through. That was in 1930; the exact date I cannot remember.

I was at the location of Deadman or Wilson Supply Ditch, being that portion of the ditch from where it intersects Deadman Creek to where it connects with Sand Creek, in the year 1932. I was there on June 16th and made a measurement of the water, and found 25 second feet going [fol. 275] through. On that trip, I was with Mr. Whiting, Mr. Watson, Mr. Greenwood and, I think, Mr. Jackson. In 1932, I also made an in- (216) spection of Bob Creek Ditch.

On the 17th of June, 1932, I made a measurement of water flowing through Bob Creek Ditch, and there was 6 second feet. There was a gauge staff or recording device installed to determine that flow. I read the gauge height and made a measurement myself. I inspected the Columbine Ditch on that date and made a measurement there of 4 second feet of water flowing in that ditch. On those inspections of Bob Creek and Columbine Creek, the same party was with me that was with me on the Divide Ditch—the Wilson Supply Ditch, on the 16th of June.

(217) While I was observing the construction of the West Side Collection Ditch in 1929, I had occasion to make some photographs of the condition of the ground during the course of construction and showing the actual construction taking place

(Complainant's Exhibits Numbered 6, 7, 8 and 9 marked for identification.)

Complainant's Exhibit No. 6 is a photograph taken by myself in the forepart of July 1929 showing a steam shovel at work on the flat, back a ways from where that ditch empties into the Laramie River. When I refer to the "flat", I mean that portion of the ditch constructed across

the valley of the Laramie between the mountainside and where it empties into the Laramie River.

Complainant's Exhibit No. 7 is a picture where they were just starting construction of the Rawah Ditch, or the West Side Collec- (218) tion Ditch that is located on the flat, the flat being that portion of the ditch across the valley, as heretofore referred to.

[fol. 276] Complainant's Exhibit No. 8 is a picture that is taken back just a ways, I should judge, two or three hundred feet from where it empties into the Laramie River, where the ditch connects with the Laramie River.

Complainant's Exhibit No. 9 is another photograph of the work right there on the flat, before they approached the hillside.

These four exhibits, Complainant's Exhibits 6 to 9, inclusive, are photographs taken by me at that time in 1929 showing the construction of the West Side Collection Ditch and the construction of that portion of that ditch which goes across the Laramie Valley and over from the hillside or mountainside over to where it connects with the river at a point approximately three hundred feet above the intake of the tunnel.

(Complainant's Exhibits Numbered 6, 7, 8 and 9 offered in evidence.)

(219) The construction of the West Side Collection Ditch as outlined on the mountainside would not have conveyed or be capable of conveying Rawah Creek water, or any water to the Laramie-Poudre Tunnel without being connected by that new construction across the valley. Water, if intercepted by that original construction, would find its course into the Laramie River below the tunnel; in other words, it required the new construction to make the Rawah Collection Ditch capable of delivering water to the tunnel. Those photographs, marked Exhibits 6 to 9, are pictures of the construction on that new portion of the construction work on the ditch.

I know where the Divide Ditch, sometimes called the Eaton Ditch, is located. I have been to the point where the headgate diverts water from Sand Creek and have inspected those diversion structures. I was up to the ditch, but not up to the gate, in 1932. I was there on (220) [fol. 277] June 21st, 1932, and measured the water flowing

in the ditch. It had a gauge height of 1.55, with a discharge of 43.76 second feet. That was five days subsequent to the time I measured the discharge through the flume on the Wilson Supply Ditch, which was on the 16th.

I did not go to the headgate that day; I have been up there when the diversion gate was open and water was being diverted from Sand Creek to the Divide Ditch. At one time I was there, the gate was closed and there was no water passing. It is a Tainter gate, which is (221) supposed to be absolutely water-tight, and it was in that condition when I inspected it.

The Wilson Supply Ditch has been constantly enlarged from the year 1929 to 1932. As to how that enlargement would be effected--the water—it is flowing into the canal all along the bank on the upper side, and that would of necessity gradually sluice down, cut the bank down, and cause the dirt to slide right out into the ditch, and they keep throwing that out. The effect of the water coming in above and disintegrating the upper bank to some extent, and the cleaning out and throwing that material over on the lower bank, increases the capacity of that ditch, both in depth and width.

I have observed that the ditch, as it is now in operation today, has been altered on its course from the original ditch construction. The ditch, as first constructed, kept on a contour around a little spur that came out, and afterwards they cut through that spur and shortened their canal and made a more direct straight line to carry it. As a (222) result, the only increase in the quantities of water from the water-shed it possibly could collect, after its first construction, anyways near its present capacity, would be cloudbursts or something of that sort, to throw in more water and run right down at a very short period.

As a matter of fact, the period of flow in that ditch each year is rather short, and during that time, the capacity of that ditch and the available water supply will determine the amount that will be captured. It would take all of the [fol. 278] snow that might happen to fall in there, but I doubt if it would take all of the water that might fall in rain, as I have seen rain fall. At any rate, it will continue to take more by this constant enlargement.

Going back to the east portal of the Greeley-Poudre Tunnel and the Venturi flume, there were accumulations there

of debris and rock in the bottom, excepting at the throat of the Venturi; and when I made the measurement there where Mr. Loose told me where to go to, I found a rock that was wired in there—it had the appearance of about a foot (223) square. It was anchored. I loosened it and the water removed it as soon as the wire was detached; I had to wabble it quite a while.

(224) (Complainant's Exhibit No. 10 marked for identification.)

(Compilation made by Goyne Drummond, Civil Engineer, of current meter measurements of water diverted from the headwaters of Laramie River to Sand Creek.)

[fol. 279] Complainant's Exhibit No. 10 omitted. Printed side page 1373 post.

[fol. 280] (224) The data as compiled and made up in Complainant's Exhibit No. 10 are my own figures; they were made for the State Engineer of Wyoming. It refers to the measurements made on the dates indicated on the memorandum, of the Deadman Ditch and what we call the Deadman Extension Ditch—all of those tributaries that contribute water (225) through that ditch. Those measurements were taken about seventy-feet upstream from where it empties into the drainage of Sand Creek—what was supposed to be their old rating flume. I never found any other measurements or official records of stream flow through that ditch.

(Complainant's Exhibit No. 10 offered in evidence.)

(226) Cross-examination.

By Mr. C. D. Todd:

Complainant's Exhibit No. 10 is a compilation of the several measurements that I made at different times on the Wilson Supply system when I was there in the years 1929, 1930 and 1932. I never did gauge it at its peak. The ditch was not carrying a very large quantity of water at the time I made my July measurements of two or three feet. There was not much snow fall.

I do not know as to the amount of snow on June 16th, 1932, when I had 25.2 feet. That was the amount of water

in the ditch when I made the measurements; there was more water in the ditch at that time. The quantity of water that could be collected by that ditch from year to year and discharged into Sand Creek would depend on the amount of rain, snow and flood. I would say that if the same amount would be (227) coming in the same week or year in any two successive years, that would be a coincident. I should judge the ditch was able to carry 100 second feet.

The enlargements or cleaning of the Deadman or Wilson Supply Ditch in 1929 and 1930 was from the cabins clear to the end where it flows into Sand Creek basin. This ditch is built very slightly on the side of a mountain. In its construction, nearly the whole of it was set into the [fol. 281] ground. Constant erosion would carry debris, sand, gravel and rocks down into the ditch. If properly maintained, it would be necessary to have it cleaned. The time of cleaning would (228) depend a whole lot on the amount of water that came in over the side of it; probably it would get more water in one year and cause more erosion than in the next. I should judge, the ditch, if properly maintained over a period of years, would have to be cleaned from time to time and the debris that had been washed into it would have to be cleaned out.

In the process of cleaning the ditch, I would put the dirt on the lower side, if I was doing it, and that is what was done there. It was not necessarily put over there to strengthen the bank, but to get rid of the material. I do not know how you would take the dirt away, but the main thing is to take it out of the ditch. I would not say there is any other place to put it. It is true that all mountain ditches, where the land is higher on one side than on the other, the debris and wash from above tends to accumulate in the ditch and fill it up as long as water is coming in, and you have to clean it out frequently to maintain your ditch. (229) The place where the ditch curved around the mountain was a flat spur that led out to the south, and the original survey was run and constructed on a contour around that. That ditch, I should judge, as near as I could tell by the constant erosion in that number of years, was built, say three feet on the bottom, and then later on they went through this flat spur that was there probably for four or five hundred feet and made a cut through it. They made a

curve in that ditch and then made a more direct line. I could not say whether it was in proper maintenance of the ditch; it was an improvement, no doubt of that. As to the improvement ordinarily made in the care of almost any ditch, that depends altogether on the class of material which you are in.

[fol. 282] I made a measurement at the Divide end of the ditch, where it crosses from Sand Creek over the divide into Sheep Creek, and got, I think, 43.76 cubic feet. It would be a pretty hard proposition to tell how much of that was Sand Creek water and how much was Deadman water unless I had gone up and measured Deadman at the same time. I (230) should judge, in that elevation, that the rain and snowfall would run off from Sand Creek and Deadman pretty close at the same time. There is not a great deal of difference in the elevation. I would have had to measure both places to know which was Sand Creek and which was not.

Cross-examination.

By Mr. William R. Kelly:

I have been over the mountain from the east portal of the tunnel to the west portal. There was too much snow on the ground to find any marsh, but I understood there was a lake over there. The drainage or seepage from that lake would come out when the heat got sufficiently strong to melt it. By the end of the fall in this dry climate, I should imagine it would be pretty well exhausted.

The elevation of the west portal of the tunnel is right at nine thousand feet; I do not know the elevation of the east portal. (231) I do not know how high the east portal is above the Cache la Poudre; I do not know that elevation. It drops down pretty rapidly from the east portal of the tunnel; you tumble down there pretty fast. I did not see a rope along the path to help a person climb up, but I would have appreciated it very much if there had been one in. It is a steep and difficult climb.

When I stopped there that time and took the measurement, the dog did not bark, he just came around and gave me a friendly look, and the man gave me an unfriendly look. I did not stop down at the house on the river below the east portal of the tunnel; he did not invite me to stop

and I had nothing to stop for. I could see there was a [fol. 283] house there that apparently belonged to the tunnel. I did not make known my business before I went up there, because I could save about twenty or thirty feet of climbing by starting in up there at the bridge. I was never refused permission to go up there. That evening, when I (232) called up Mr. O'Brien, he told me to make all the measurements I wanted. I think Mr. O'Brien said he was superintendent of that company. Two days after that, the Assistant Attorney General of Colorado informed me that I could make any measurements of any ditch or stream I wanted to make in Colorado.

I do not know the fall inside of the tunnel from the west portal to the east portal; the fall for the first fifty feet, I should judge, would drop twenty-five. I do not know that after you get inside of the tunnel, there is two hundred and fifty feet; the condition of that tunnel I did not care to go in to see. I did not go inside it. I would not say there is two hundred and fifty feet drop in the tunnel from the west portal to the east portal—I could not say how much drop there is, because I never made any tests either by level or aneroid detector.

I should judge that this Venturi flume I found there in 1929 is accepted as a good kind of flume for the measurement of water. I understood that this one was established by the United States Department of Agriculture, but there evidently was lack of experience in the handling of that kind of flume or you would never place it in that (233) position. As to its being down a very steep mountainside if it were placed directly in front of the tunnel, it goes down a very steep mountainside anyway. It drops over into Tunnel Creek right shortly in front of it; but that could have been turned into the same creek very easily right below. There is quite a little construction to avoid the sluicing away of that loose material. It could have been placed at the side enough to have avoided a good deal of concrete construction to prevent erosion.

[fol. 284] I could not say that the seepage inside of the tunnel would be the least in the late fall. I could not determine, and had no way of determining when would be the least amount of seepage in there.

The purpose of that tunnel is not to collect the water from the Laramie River and its tributaries, but to carry it

through. It could not carry it through if it were not collected and could not get any water out of the Laramie River unless the ditch had been built from the mouth of the tunnel over to the river. I found a dam across the river bed at the west portal of the tunnel to divert the water into the tunnel, and I saw the foundation of a dam or reservoir below that in the Laramie River. I never went to it to examine it. I saw some (234) concrete structures there and they told me that was for a dam.

As to whether, if the West Side Collection Ditch water was turned into that reservoir and the reservoir dam was finished, it would throw the water into the tunnel—I never took the elevations; I do not know what the elevation is between the mouth of the tunnel and the outlet of the dam. I did see that there was considerable old work in various places on the West Side Collection Ditch. There were no tunnels constructed, except the very late construction. There was no tunnels constructed on that ditch before 1929 that I ever saw. I never was or it until after they had gone on to construct. When the tunnel was driven, I have no idea. I did not see them driving the tunnel.

Referring to my photograph, Complainant's Exhibit No. 6, it is not climbing up the mountainside. That is out right close to where the trail comes down Rawah and crosses the Laramie River below. There is a trail right here at the edge of this timber on that little knoll. It is not on the bed of the Laramie River, but it is on (235) practically a flat that extends across from the stream bed to the slope of the mountain.

[fol. 285] The grade of the West Side Collection Ditch varies. I would not know its average grade, but it has got fall enough to carry the water all right. I do not know the elevation of the dam on Rawah Creek. It is considerably higher than the water surface of the Laramie River at the tunnel intake. I should imagine it is quite swift. No question about the tunnel being swift, excepting at one time it was not very swift when I was there. The water was five feet, a little over five feet deep at the intake—that is where the highway bridge crosses the structure there at the headgate—and it was away above the mouth of the tunnel. It indicated to me that there had been a fall inside of the tunnel, or an obstruction inside, but it did not to your engineers. Your engineer said it was air in the

tunnel. My opinion was there had been a fall of rock inside. Seepage inside the tunnel is one cause, and (236) there might be other causes for it to drop. I- could never happen if properly lined. If it is not lined and there is wetness above, it is liable to drop any time, and it does not take a great deal of water to cause it.

Lost Lake and Laramie Lake, and those up there of the Water Supply & Storage Works, had the appearance of having been constructed for some time. Of course, you cannot tell after four or five years how long they had been constructed, but there were young pines growing on the embankment, which would indicate that it had been constructed several years—that is, at Lost Lake. The one above the Laramie Lake had no growth on it and that might have been constructed five or ten or fifteen years, I could not tell.

Redirect examination.

By Mr. James A. Greenwood:

It would be more or less difficult, in the absence of measurements made almost simultaneously, to distinguish the Sand Creek water passing by the diversion gate in the Divide Canal, from Sand Creek over to Sheep Creek, from Deadman water passing through the same course. How- [fol. 286] ever, all of the water coming down Sand Creek to the (237) diversion gate on the Divide Ditch was being diverted, whether it was Deadman or Sand Creek water, at the time of my inspection there.

I was at the West Side or Lower Rawah Collection Ditch in 1929 when that construction was commenced. I was making a survey in there myself.

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(259) Henry G. Watson, a witness in behalf of complainant:

Direct examination.

By Mr. James A. Greenwood:

I live in Cheyenne, where I have lived for twenty-eight years. I am a civil and irrigation engineer and have been such for the last twenty-eight years. I am a graduate en-

gineer of the University of Michigan, and a licensed engineer in Wyoming. I have pursued the profession of engineering in Wyoming and Colorado since the time of my graduation.

My first engineering enterprise undertaken in Wyoming was as a draftsman, I think, in the State Engineer's office in 1905. (260) I gradually progressed from drafting to general engineering work, doing work in the field for the State Engineer's office, until 1908. From 1908 until 1910, I was working in the northern part of the state for a year, and then in Colorado for a year, on construction work, mostly. All of this was irrigation work—reservoir construction in the Big Horn mountains in 1908 and 1909, and general construction work in Colorado in 1909 and 1910.

After that, I was deputy State Engineer in the office of the State Engineer of Wyoming until 1915, and making trips into the field investigating water and construction and reporting on them. I returned to the office of the State Engineer in 1920. Between the years of 1915 and 1920, I was engaged in general engineering work, irrigation, water supply, water works. I put in about six months on the census work, and a year and a half in working for the of- [fol. 287] fices of the Irrigation Investigations of the United States Department of (261) Agriculture of the Federal Government. From 1920 until the first of April of this year, I was deputy State Engineer—approximately twelve or thirteen years.

I am fairly well acquainted with the headwaters of the Laramie River. I acquired that acquaintance from June, 1929, until last week. I became acquainted with that territory through making surveys and trips into the country to find what water was being diverted for use in the Laramie River basin, or to be taken out of the basin for use in the Cache la Poudre; I inspected certain trans-mountain diversion works constructed to take water from the Laramie River water-shed to the Poudre.

I surveyed the ditches on top, being those from Bob Creek, (262) Columbine and Deadman, and the Skyline Ditch, at the head of the Laramie River, and other ditches. By Deadman Ditch, I mean the Wilson Supply Ditch. I have visited what is known as the Divide Ditch or Eaton Ditch, mostly to make surveys. These surveys were to locate the ditches on the ground and ascertain their size,

capacity and conditions; their dimensions and capacity and everything, and I made a record of them. For instance, I ascertained where the Bob Creek Ditch was constructed to deliver water over into the Cache la Poudre basin at the head of the stream commonly known as Roaring Fork or Creek. A considerable portion of the water received by that ditch in the early season, May or early (263) June, from rain and melting snow, would come over the ditch bank, running direct into the stream and not down the streams. If left to its natural course, that water would go down Nunn Creek and into the Laramie River; but from artificial interference by the construction of these ditches, it goes into the Cache la Poudre valley. The Columbine Ditch does the same. The Wilson Supply Ditch diverts to Sand Creek, and from Sand Creek, into the Cache la Poudre [fol. 288] valley by means of the so-called Divide Ditch into the north branch of the Poudre or North Fork. All of these ditches are designed to, and do capture water that would naturally go to the Laramie River, and turns it to the Poudre River or Sand Creek, a tributary of the Laramie.

I am familiar with the location of what is known as the Lost Lake System, consisting of Lost Lake, Laramie Lake, Twin Lake, a small pond below Twin Lake, and Lily Lake. These lakes collect water (264) from the tributaries of the Laramie River and deliver it from Lost Lake into Chambers Lake in the Cache la Poudre basin. Chambers Lake empties into the Cache la Poudre River.

I am familiar with the Skyline Ditch. That ditch also collects water from the Laramie River watershed and delivers it to the Poudre River through Chambers Lake. There is no connection physically or geographically between the points where the Lost Lake system empties into Chambers Lake and where the Skyline Ditch empties into Chambers Lake. The distance between those two inlets is between a half-mile and a mile. I expect there is only one outlet out of Chambers Lake, but I never examined carefully to see.

I know where the Wilson Supply Ditch intersects or taps Deadman Creek. As to the location of the headgate or diversion point—there are two channels on Deadman Creek crossing the section line between Sections 14 and 15, Township 10 North, Range 75 West. The Wilson Supply (265) Ditch or Deadman Feeder Ditch taps those streams almost on the line tion line between Sections 14 and 15, Town-

ship 10 North, Range 75 West, within four hundred and fifty and twelve hundred feet north of the southeast corner of Section 15. I call the Deadman Feeder Ditch and the Wilson Supply Ditch the same ditch.

There are other streams both above and below Deadman that are tapped by the Deadman Ditch in addition to the headwaters of Deadman Creek. Those below are on the course of the Deadman Ditch from the headgate to where it connects with Sand Creek. I mean the Wilson Sup y [fol. 289] Ditch when I use that term, and those above are tapped by an extension of this Wilson or Deadman Ditch. It requires an extension of the ditch (266) back beyond the diversion point on Deadman into the Wilson Supply to collect water from those other tributaries.

I took several measurements of the dimensions of the Wilson Supply Ditch from the point of diversion on Deadman down to where it empties into the Sand Creek course. As to whether I observed any enlargement or improvement or additional construction being done on that ditch at any time, when I was first on that ditch in 1929, the section north and west of Deadman Creek had the appearance of being rather newly constructed. The extension to the south of Deadman Creek had the appearance of having been in use for some years without much work done on it. By the extension to the south, I mean the extension above the point of diversion. The Wilson Supply Ditch, taking water from Deadman Creek to Sand Creek valley, had the appearance of having been worked on within comparatively recent time —that is, a few years.

By "worked on," I mean having the ditch enlarged; the banks had been increased in size and the ditch widened. The widening and increasing of the size of that ditch would enable it to convey more water.

(267) As to observing any survey or cross-section outline for further construction or extension in my inspection up on the territory where the Wilson Supply Ditch and extension is located, on the extension ditch through Section 22, about a mile or so, the stakes had been set to widen the ditch from about an eight foot ditch to a twelve foot ditch. The stakes were set back sometimes three or four, very often, four feet. To my knowledge, I would call it a program of enlargement. It might not be necessary to set cross-section stakes to clean out a ditch, but would for such a

great enlargement. My observation was that it was a clear attempt to increase the capacity of that ditch.
[fol. 290] I visited that territory there in June 1932, and the enlargement had apparently been carried out; it was larger than it had been, but the stakes, of course, had disappeared in the meantime. James A. Greenwood, Attorney General, Mr. Jackson, deputy Attorney General, John A. Whiting, State Engineer, and Goyne Drummond were with me on my visit in 1932.

On my first visit when I observed the cross-section stakes, (268) Mr. Drummond was with me. I made memoranda or note in my dairy that I found stakes for that enlargement. I have in my possession my memoranda showing the dimensions of those various ditches I surveyed, and the Wilson Supply Ditch particularly.

(Witness produces memorandum and reads into the record the dimensions, length, width and depth, of the Wilson Supply Ditch between Deadman Creek and Sand Creek.)

I will read them back up stream. Beginning at the lower end on the section line, the west side of Section 15, about 1800 feet south of the northwest corner of the section, is a rating flume constructed of timber. The flume is 16 feet wide, 5 feet deep, and 14 feet long. About a half mile farther up the ditch, being in the northeast quarter of the southwest quarter of Section 15, we found the ditch to have a bottom width of 8 feet, a top width of 15 feet, and a safe depth of carrying water of 3 feet. In the northwest quarter of the southeast quarter of Section 15 there is a rectangular cut across a branch of Deadman Creek, which drains a swamp, and in that section the ditch is 9 feet wide and 3 feet deep. Immediately above that cut, in the same (269) forty, the size of the ditch was 8 feet in the bottom, and 14 feet wide on top, and 3 feet deep. About a thousand feet farther up the ditch, in the southwest quarter of the southeast quarter of Section 15, the ditch was 8 feet in the bottom, 15 feet wide on top, and 3 feet deep. Five hundred feet farther up the ditch, in the southeast quarter of the southeast quarter of Section 15, the ditch was 7 feet on the bottom, 13 feet [fol. 291] wide on top, and 3 feet deep. About four hundred feet farther up, in the same forty, being about five hundred feet below the waste gate, the ditch had a width of 6 feet on the bottom, 13 feet on top, and a depth of 3 feet.

Those are the only measurements made on the ditch up to Deadman Creek.

I made some surveys and notes on the other ditches—the Bob Creek, the Columbine, and that extension on beyond the Wilson Supply; I made measurements of all the ditches in all sections. There was no automatic register on the Wilson Supply Ditch when I was there; there was a box for it, but I never saw a register there.

I think the last time I was at the rating flume on the Wilson Supply Ditch was on the 16th of last June. I heard Mr. Drummond testify this morning, and I was there at the same time—when the (270) measurement was taken there. I saw, approximately 25 feet of water running in the ditch. With relation to the capacity of the ditch, that 25 feet took up a very small part of the area. That ditch could have carried at least four times as much, and probably more.

I was on Bob Creek in 1932, the day after we measured—it would be June 17th, I think. There was water flowing in that ditch that day, and a measurement was taken. The same condition prevailed as to Columbine Creek.

As to observing any portions of a former construction (271) on the Wilson Supply, and what we call the old ditch—any portion that had been abandoned and new construction made, I noticed one place along—it would be about the north—I would not say off hand where it was on the ditch; it was about half way from Deadman. I was present when Mr. Whiting made photographs. I saw the photograph yesterday in Mr. Whiting's file.

I would say the capacity of the old construction was about a tenth—not to exceed a tenth of the capacity, probably less—of the capacity of the new construction.

[fol. 292] As to whether I observed any improvement or enlargement being carried on with reference to the Wilson Supply Ditch the different times I visited it, the only place I noticed any particular work done was above Deadman Creek on the extension where it had been enlarged; not below. The effect on the capacity of the Wilson Supply Ditch of constantly cleaning and removing of debris or silt that slid in over the upper side, would be to enlarge it if they were a little strong on cleaning.

(Complainant's Exhibits Numbered 11, 12, 13, 14 and 15 marked for identification.)

(Photographs taken of sections of the Wilson Supply Ditch.)

(272) The picture, Complainant's Exhibit No. 11, delineates a section of the old location, where the old location had been changed to go through a cut. That is what I referred to in my testimony as to my observations of the old ditch. It is, apparently, the old original ditch.

Complainant's Exhibit No. 12, is a picture of the Wilson Supply Ditch taken near the measuring flume. These pictures were taken around six o'clock in the evening of June 16th, 1932. I was present when they were taken.

Complainant's Exhibit No. 13 is a picture of the measuring flume on the Wilson Supply Ditch, being the one near the west line of Section 15, being the only one in operation on the Wilson Supply Ditch. (273) Both pictures were taken on the date when I stated the measurement showed approximately 25 feet of water running.

Complainant's Exhibit No. 14 is a picture showing erosion on the upper bank of the Wilson Supply Ditch, on the same portion of the ditch between Sand Creek and Deadman Creek.

Complainant's Exhibit No. 15 is another picture of the measuring flume on the Wilson Supply Ditch taken on June 16th, 1932. I was present when the picture was taken.

[fol. 293] These photographs, Complainant's Exhibits Numbered 12 to 15, correctly represent the physical condition of that ditch as of the date of June 16th, 1932. Exhibit No. 11 shows the depression or small bank where the old ditch was, as of the date of June 16th when that was taken.

As to my statement as to my having observed cross-section stakes set on that portion of the ditch above the Wilson Supply (274) called the Extension, and as to what took place with reference to those stakes resulting in the enlargement of the ditch, or whatever the purpose, the ditch was enlarged by either the enlarging or cleaning. Whatever it was, it increased the capacity materially.

I have visited a good many times the location of the headwaters of the Laramie where the west portal of the Greeley-Poudre Tunnel is located. I was there in 1929 several times. At that time, the West Side Collection Ditch, or Lower Rawah, was under construction. The first time I went there, it was not. From my observation of the condi-

tions along that course, as to whether there was an outline for a completed ditch, or for portions of a ditch, where the ditch now has been constructed, I did not go over the lower end of that ditch from alongside the mountain across the flat to the river. You could see where a ditch had been staked out—that was in June, 1929. The next time I was there was the latter part of July, and they were working with the shovel; they were running across the flat and going along the side of the mountain (275) gaining elevation as they went. I imagine it must have been a half-mile or three-quarters of a mile from the river when I first saw them in July.

I spoke of going across the flat—I mean the bottom of the Laramie River valley there, as differentiated from the slope or side of the mountains. The ditch, as now constructed, enters the Laramie River about three or four hundred feet above the point where the water is diverted from [fol. 294] the Laramie River to go into the Laramie-Poudre Tunnel. I did not carefully observe that territory across the flat before this ditch was constructed, but I would say that the construction was a new idea from the fact that there is a large drop in the ditch—a direct drop of, I imagine, ten feet or more, in elevation up to the point where the original plans called for a storage reservoir or dam.

I have examined the cement structures for evidences of the former plan of constructing a reservoir, and I would say that that (276) plan had been entirely abandoned. Apparently, the original intention was to run water into a reservoir and store it during the whole year, and then run it in the tunnel, and that would have to have a higher reservoir for the water above the tunnel in order to get any capacity so as to use it. To carry the water off the reservoir, they would have to maintain the elevation of the ditch above the high point of the reservoir and to abandon that they dropped down some to go into the river above the tunnel.

I do not ever remember seeing the tunnel intake when there wasn't water going into it. There are boxes in two places for gauges at the west portal, but I have never seen a gauge there.

I have observed diurnal fluctuation in mountain streams in high altitudes at various times in the year. I have noticed and (277) observed it in the summer time, June, July, August and September, and clear into the winter, in streams

of the Big Horn Mountains, particularly. Such observations were made mostly back about 1908, 1909 and 1910. I have observed the records which have been made, and made observations of my own only at the times I was in the mountains.

With reference to fluctuation in daily flow, the greater variation in a mountain stream would be in early summer —the big variation, when the snow is melting off, especially the blanket snow. In the winter time, if a mountain stream is running at all, the fluctuation in the daily flow will be very [fol. 295] slight, probably not noticeable, the variation of flow day and night. I base that statement on the fact that there is no snow melting, and the water supply is received from ground water, and that discharges very uniformly during the day and night, particularly if that stream is flowing beneath a coating of ice. There (278) would be very little variation when it is flowing under ice or snow. I might say, there is very little difference in the temperature day and night, even when the sun shines in the day time, and only occasionally we get a day that is warm enough to melt snow during the winter time.

I have been over and made observations of the various ditches diverting water from the Laramie River to what is called the "Meadows" in Colorado. I inspected those ditches in the fall of 1929 and fall of 1930 with Mr. Goyne Drummond, a special assistant engineer, and Mr. Earl Lloyd, first assistant State Engineer. We observed all the ditches we could find diverting from the Laramie throughout that meadow area in Colorado. I have got the number we found listed some place, but I havn't got it with me; I imagine sixty or seventy ditches.

We inspected the point of diversion of the ditches from the river. In most of the ditches, the only diversion works consisted of a rock dam in the river. There were no regulating works, except in a few ditches, and many of them at one time had had headgates or regulating (279) devices which had become dilapidated and the structures were out of commission. We found no automatic registers; we found one miner's inch measuring box in one small ditch. At other places, there were measuring flumes which could be used. On one or two of these flumes, I think there were boards or lath marked with saw marks to indicate the depth of the water. Apparently, to irrigate, they turned the full ditch

of water out and let the surplus flow back into the stream where it could.

Of the number of ditches I inspected—approximatly sixty, I expect less than ten per cent had some kind of a rating flume; about half of ten per cent had a gauge rod or measuring rod of some kind; the rest of them were just mere turnouts. Some of them had headgate boxes in them, but no [fol. 296] gates to regulate them. The boxes just assisted in (280) turning the stream without attempting to regulate the flow.

Cross-examination.

By Mr. William R. Kelly:

I could hardly say that my particular business over there was to check the measurements of water into the Meadow ditches, because I was there when there was very little water being used. My observation of the Meadow ditches was to see what land was being irrigated. I was there in the fall of the year after the irrigation season had ended, so I do not know how much water was being used there.

It is a little hard to say whether I found any of them running water without going back and checking the daily records. It would be immaterial at that time of the year if I found some running water out for stock water; the water usually running in a ditch was water just being diverted because the ditches were open. There would not be a diminution of the water at the state line at that time, except through natural loss, through evaporation by spreading it. I did not (281) see any substantial amount at that time. The general idea of irrigating seemed to be to take the water into the headgate in a good flow and run it out over the lands and meadows, and back into the river. I am fairly well familiar with the method of irrigating hay meadows on the Little Laramie River in Wyoming, which is practically the same method. I never observed whether the same method is practiced in the Sand Creek valley on hay meadows. In the irrigation of mountain meadows, it is generally used that way, although there is a variation in the amount of water that is actually diverted at different times.

The valley of the Laramie River in Colorado is very loose soil in some places, and in some places, it is pretty tight. It sure holds water a long time. I do not know anything

about the geological formation of the country. There may be a great deal of disintegrated granite in it, but I do not know. The river bed itself is gravelly.

[fol. 297] (282) The Laramie River valley in Colorado varies from less than a quarter of a mile to about three-quarters, maybe a mile, in width in some places. At the Colorado-Wyoming line, it is a very narrow valley. There was no hay meadows being irrigated at the upper end of the valley in 1929. There are ditches up there, but none of them were being used, that I could observe.

There is no particular difference in the method of use of water in the Little Laramie River valley in Wyoming and the upper Laramie valley in Colorado. I guess that system is known as the flooding system; it is the same system practiced on the Big Laramie in Wyoming above the Wheatland Reservoir.

I understand they grow quite a little alfalfa in Wyoming; I did not happen to see any up above. There is alfalfa down around Laramie; I am not sure as to above. I never made any calculations of the return flow of water in the Laramie River in Colorado above the state (283) line, nor did my office make any investigations under my supervision. I do not know of any such.

(284) The latest time I was at the west portal of the tunnel was last Saturday, April 15th. Prior to that, and beginning with 1929, the latest time of the year that I was there has been late in October. I estimate about 80 or 85 feet last June as the most water I have seen running through the tunnel. I saw about two and a half feet going into the tunnel last week. The same amount was in the Laramie River at that time; practically the whole stream, except what leaked past the headgates, was going into the tunnel.

I have been to the head of the West Side Collection Ditch on Rawah Creek. I could not say whether it is at a different location (285) that the original Rawah Ditch when it was being built, when this Wyoming-Colorado suit was being tried before. I know the tunnel toward the lower end of the West Side Ditch. I do not know whether that is the [fol. 298] same tunnel which was there when this case was being tried before; I was never there those days.

As to whether the location of the West Side Ditch, at its lower end, exclusive of across the flat, is any different than it was when the Colorado-Wyoming suit was previously

under hearing, north of the old proposed damsite, the new ditch is built on a location that had been partly built and partly benched out for two or three miles. That is, prior to the year 1929, when I first began investigations, there was a very small portion excavated; some had been benched out and a little excavating done. There were sections along its course opened up, and other sections not done.

I did not see any tunnels along the then constructed work prior to 1929; I did not see any there on the old work. I followed over the course of the old ditch prior to 1929 as far as we could locate (286) it, and then followed it up to Rawah Creek. I did not see any tunnel on the old pieces. As to my stating that I did not make a very close examination of the line of the ditch along the flat of the Laramie River, that was in June, 1929, the first time I was there.

Cross-examination.

By Mr. C. D. Todd:

I testified yesterday afternoon concerning some measurements of the Wilson Supply Ditch, particularly from the point of junction with Sand Creek on up to Deadman and beyond. I made those measurements on July 30th and 31st, 1929, at numerous places across Section 15 (referring to Complainant's Exhibit No. 5, being the map and statement of the Wilson Supply Ditch filed with the State Engineer of Colorado). I began on Deadman and worked down to where the ditch ran out into space, and just dumped it down the natural waterway.

(287) There were measurements made approximately on the section line on the west side of 15, the line as shown on the blue print, and where I found it was somewhat different. [fol. 299] I found a rating flume at the place of measurement on the west side of 15. The dimensions of that flume were 16 feet wide, 5 feet deep, 14 feet long. As to the ditch corresponding with it, the ditch was amply big to carry water, but it was washed to some extent on each side of it.

I next made a measurement in the northeast of the southwest of Section 15, and found the dimensions there to be 8 feet wide in the bottom, 15 feet wide on top, and 3 feet deep. I made my next measurement where the ditch crossed the

small tributary of Deadman Creek in the northwest of the southeast quarter of Section 15, and the dimensions there were of a rectangular section, 9 feet wide and 3 feet deep, across a swamp. That portion of the ditch crosses a typical mountain swamp.

We next measured a number of places through the southeast quarter of Section 15, but the line as actually constructed does not agree with the line shown on the blue print. It varies, say five hundred (288) feet from where the line, as shown on the blue print, is located. In most places in the southeast quarter, the dimensions of the ditch were 8 feet on the bottom, it varied from 13 to 15 feet wide on top, and 3 feet deep, and continued that up to the connection with Deadman Creek. It was a little smaller just below the point where water is taken from Deadman Creek, being only 6 feet on the bottom.

I found the grade of that ditch to be 1.1 foot fall in 660 feet, which would be 8.8 per mile. That would give a capacity of approximately 100 second feet. That is the approximate capacity from Deadman to where it spills into the Sand Creek drainage. You state Complainant's Exhibit No. 5, map and statement of the Wilson Supply Ditch, fixes the capacity to which it is to be constructed as 117 feet; that would not be a great deal of divergence from what I found the capacity of the ditch, as I examined it, some thirty years afterwards. The original statement states that the depth of the ditch to water line was 3 feet; that is about what it was. So, in general size and capacity, (289) the [fol. 300] ditch I found was constructed reasonably close to the original plan as indicated by this map and statement.

I went above Deadman Creek on the same line of ditch, up to the branch of Deadman Creek in the southwest quarter of Section 23, Township 10 North, Range 75 West. There is no ditch beyond that point, except a little excavation that extended just beyond the creek about a hundred feet. I followed a clearing well into Section 26; I could find no ditch in that clearing.

Looking at a map attached to Page 101 of Complainant's Exhibit No. 1, concerning which you state Mr. Fleming testified as having fully surveyed this ditch line in 1902 and finding ditches there, I see a ditch shown across there, described by legend as the "Divide Ditch." I also find on this map, the line of the Sand Creek as it extends south

from the headgate of that Divide Ditch, and the Wilson Supply Ditch from (290) Sand Creek to Deadman Creek. From the section line between Sections 15 and 16, to the east line of Section 15—that is, across Section 15, the line is about as we found it in 1929. I also find a line indicating a ditch south from Section 15 to 26. That is the line of ditch that I am calling the Deadman Extension; on this map, it is given the name of "Columbine."

The Columbine Ditch, as constructed, does not go down to Divide Ditch, and it doesn't go down to Wilson Supply. I saw a ditch above in the southwest quarter of Section 23, approximately on this line. Regardless of names—we have found it to have all kinds of names—there is an extension of what we call Wilson Supply Ditch south of Deadman Creek.

The ditch above Deadman was a smaller ditch, running between four and five feet on the bottom, seven to eight feet wide on (291) top, and two feet deep. The ditch of that dimensions extended up to the northwest quarter of Section 23, and above that, there was a smaller ditch. It [fol. 301] runs up to the southwest quarter of Section 23. That ditch is about 2 feet on the bottom, and 6 to 8 feet wide on top. As a gathering ditch, intercepting small streams and mountainsides, it would be naturally smaller at the source and increase as it came along and crossed various gullies and streams to the end of it; and this was built in that way—smaller at the upper end than it was at the junction at Sand Creek.

I stated I found some grade stakes set along on the portion of this ditch above Deadman Creek. At the time I saw it, the ditch was not particularly in need of cleaning—not many sections; a few sections needed cleaning. It is rolling timbered country on the upper side of the ditch; and is much the same on the lower side. (292) There would be some material washed in as the cloudbursts and storms and freshets, and so forth, would occur in that locality. There would be some wash, sloughing into the ditch, all of the time.

In order to keep the ditch in shape and in alignment, it is the ordinary practice to clean it from time to time. If it has not been cleaned for three or four years, practically any kind of a ditch would have a more extensive and thorough cleaning out of the bottom than it would if it had been cleaned every year. The effect of this earth, sand and

gravel, and so forth, washing down into this ditch might narrow the bottom, but would tend to widen the top, by washing the edge down. As it came off the hillside, it would wear down the upper side and widen the top. If it fell in the bottom, it would not necessarily cause the embankment on the lower side to break. If it was a built bank, it would, if there was enough wash in the bottom to fill the ditch, if the (293) ditch was small—too small to carry the water. Whatever washed in would tend to diminish the capacity of the ditch somewhat. If perchance, a rock large enough rolled in, it would divert the water against the opposite side [fol. 302] of the ditch, washing it, and you would need to repair the bank. If you cleaned out the accumulations of several years in that ditch, you would naturally put it on the lower bank, which would strengthen it. You could put it on the upper bank; it would not be much more difficult than on the lower bank, but the lower bank is where you ordinarily put it. If this work was done, it was done according to a recognized system of engineering on ditches.

(Reference being made to Complainant's Exhibit No. 11):

(294) Mr. Greenwood: They will be introduced, if you want to interrogate him about it. Here it is.

Mr. Todd: I might interrogate from it, then.

Mr. Greenwood: It will be identified further by another witness.

Complainant's Exhibit No. 11, labelled "Old Wilson Supply Ditch," is a picture taken in the southeast quarter of Section 15. On the exhibit, a ditch shows a point running to the southwest, and as originally constructed. Since that time, the ditch has been cut across through the top of the "V" shown on the print, and this picture was taken at a point on the old line a little below the point where the location of the ditch is now cut across. This is in the southwest quarter of the southeast quarter of Section 15, as shown on the blue print in Exhibit No. 5.

I have heretofore testified that this line and my line through here are not exactly identical. The blue print shows the ditch coming to the sharp point at the half section line and then diverging off at a triangle. The way the ditch is built now is on a line (295) connecting the two sides of the triangle farther to the east, so that it does not go to this sharp point. There was a ditch constructed out around

the point at one time, but it has since been cut across. The appearance of the country indicated that the cut through had been made many years later than the original ditch. [fol. 303] I do not know personally when the cut was made, but it was made in the last twenty years, I should say, and probably less. The only effect there would be by making a cut across instead of following the course around a high place, would be to get a little more fall in the ditch for a few hundred feet at that point; otherwise, it would not affect the ditch. I would say it was changing the plan of the (296) ditch, and it would enlarge the capacity of the ditch. If the other ditch was the same capacity and went around the hill, it would be the same capacity, if it was the same capacity around the hill. If you cut through the high ground, it would be deeper. But if you had the grade on the bottom the same as where you left the old ditch, and returned to the old ditch, you would have the same capacity, if the ditch had not been enlarged in doing it.

I do not know whether the excavation I found there was a ditch that was actually put in service, or whether they changed their plan while they were constructing it; I just saw some excavations that had been used as a ditch at one time. It might have been that they abandoned it as partly constructed and made the cut through as preferable for the strength of the ditch. Occasionally you make changes in engineering.

Redirect examination.

By Mr. James A. Greenwood:

(297) I did not observe any ditch line in June, 1929, where that portion of the Rawah Ditch, the West Side Collection Ditch, which crosses the valley of the Laramie River, from the point where it empties into the Laramie to where it follows along the course of the mountainside. It must have been the last of July when I first observed a ditch line on that portion of the West Side Collection Ditch; I drove through there and saw the shovel working.

Cleaning the ditch, in itself, would not enlarge the capacity, if the work was confined to cleaning; but if erosion or the disintegration of the upper bank is constantly pushed [fol. 304] down into the bed of the ditch, and that is thrown

over onto the lower ditch bank, such operations over a period of years would tend to increase the capacity.

The ditch below Deadman Creek, as I inspected it in 1929, had an approximate capacity of 100 second feet. Referring to Complainant's Exhibit No. 11, if that indicates the condition of the ditch at (298) the time of construction, the ditch would have had a capacity, possibly, of five or six second feet. The ditch, as I inspected it, has a capacity of about 117 second feet now, as was indicated on the claim and blue print attached to it. I have no knowledge as to whether that ditch had that capacity prior to 1929; I do not know anything about it. I don't know when that ditch obtained that 100 second feet capacity, whether it was 1929, or 1920, or what time it may have been.

With the exceptions of the changes which I noted, and testified to, in the course of the ditch, the general location is about the same as indicated on the blue print. Apparently the blue print is made from what we call a fly line, which was made for filing purposes, and to avoid cutting through the actual location and getting the true location of the ditches as it would be constructed—merely for filing purposes—a short cut.

(299) There is no connection from Columbine into Deadman Extension, or Wilson Supply Ditch; none whatever. The Columbine Ditch turns across into a branch of the Poudre, rather than over to Sand Creek.

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(300) AGNES ZIMMERMAN, a witness in behalf of complainant recalled for the purpose of identifying some exhibits:

Direct examination.

By Mr. James A. Greenwood:

I am the same party who testified as Miss Agnes Zimmerman previously in this hearing.

(Complainant's Exhibit No. 16 marked for identification.)

[fol. 305] (Letter from C. C. Hezmalhalch, Chief Clerk, Engineering Department, State of Colorado, addressed to Agnes Zimmerman, Home, Colorado, dated March 14th, 1923.)

Complainant's Exhibit No. 16 omitted. Printed side page 1379 post.

[fol. 306] (301) I recognize this (Complainant's Exhibit No. 16) as a letter to me from C. C. Hezmalhalch, Chief Clerk of the State Engineer's office of Denver. I received that through the United States mail from the office of the State Engineer of Colorado, and it has been in my possession since that time. Mr. Hezmalhalch is Deputy State Engineer in the State Engineer's office at Denver, Colorado, at this time.

(Complainant's Exhibit No. 16 offered in evidence.)

Mr. Howell: For what purpose do you offer it?

Mr. Greenwood: It is offered for the purpose of showing that the Lost Lake system was operated without a decree, or any filing for it; there is no record for it.

Mr. Temple: It is not offered for the purpose of showing that the chief clerk in the State Engineer's office was advising as to the legality of it?

Mr. Greenwood: No, just for the purpose of the record.

Mr. Howell: We enter our objection for the defendant to the introduction of Complainant's Exhibit 16, for the reason that it is not the proper way to show the matter that Complainant has stated as its purpose for the introduction of the exhibit, and that this letter, purporting to be signed by the chief clerk of the State Engineer's office of Colorado, concerns (302) a matter on which the chief clerk has no authority under the law to express an opinion, and as to the matter mentioned in the letter, and whatever he may express in this letter is in no way binding upon this defendant. We object for the further reason that the exhibit is wholly incompetent, irrelevant and immaterial in this case.

(300) (Complainant's Exhibit No. 17 marked for identification.)

[fol. 307] (Certification from State Engineer's office, Denver Colorado, regarding filings on Lost Lake and Laramie Lake.)

Complainant's Exhibit No. 17 omitted. Printed side page 1380 post.

(303) This is a certification from the State Engineer's office regarding the filings on the Lost and Laramie Lakes.

I received that exhibit from the State Engineer's office, direct, on my request for it.

(Complainant's Exhibit No. 17 offered in evidence.)

Mr. Howell: The witness used the expression that it was certified to certain things mentioned in the letter.

Mr. Greenwood: The letter speaks for itself what it is; I want to show where it came from.

Mr. Howell: Simply a response to an inquiry presumably made by the witness?

Mr. Greenwood: That is it.

Mr. Howell: Why is it offered?

[fol. 308] Mr. Greenwood: It is offered for the purpose of showing that the records of the State Engineer's office, as searched by the deputy State Engineer, do not disclose any decrees having been awarded to either Lost Lake or Laramie Lake. It merely certifies that she has been unable to find that at that time in 1925.

Mr. Howell: We object to it on the ground that it is incompetent, irrelevant and immaterial, and hearsay.

(300) (Complainant's Exhibit No. 18 marked for identification.)

(Letter from M. C. Hinderlider, State Engineer of Colorado, addressed to Miss Agnes Zimmerman, Home, Colorado, dated December 11, 1926.)

[fol. 309] Complainant's Exhibit No. 18 omitted. Printed side page 1381 post.

[fol. 310] (305) I identify this (Complainant's Exhibit No. 18) as a letter from M. C. Hinderlider, State Engineer, in reply to an inquiry of mine regarding the gauge charts of the trans-mountain diversions to the Cache la Poudre River, on file in his office. I know Mr. Hinderlider's signature and his signature is on that letter. That inquiry embraces the gauge charts of the Laramie River Tunnel for the year 1926.

(Complainant's Exhibit No. 18 offered in evidence.)

Mr. Greenwood: That is offered for the purpose of showing over the State Engineer's signature, that the records were incomplete at that time and could not be furnished.

Mr. Temple: It is supplementary, apparently; have you the other letter?

Mr. Greenwood: We will get it.

Mr. Howell: We object to Complainant's Exhibit No. 18 on the ground that the letter apparently refers to a previous letter and earlier correspondence, as shown on the face of it, and as the matter now stands, it is not intelligible as to what inquiries were made in prior letters, and further that it has no bearing upon the issues in the present case, and on the further ground that it is incompetent, irrelevant and immaterial.

(300) (Complainant's Exhibit No. 19 marked for identification.)

(Letter from M. C. Hinderlider, State Engineer of Colorado, addressed to Miss Agnes Zimmerman, Home, Colorado, dated November 26, 1927.)

[fol. 311] Complainant's Exhibit No. 19 omitted. Printed side page. 1382 post.

[fol. 312] (306) That (Complainant's Exhibit No. 19) is a letter from M. C. Hinderlider, the State Engineer of Colorado, in reply to an inquiry regarding diversions shown by the Laramie-Poudre Tunnel for 1923, 1924 and 1925. I received that letter from Mr. Hinderlider through the United States mail; it is dated November 26th, 1927.

(Complainant's Exhibit No. 19 offered in evidence.)

Mr. Greenwood: This exhibit is offered for the purpose of showing, by the statement of the writer, M. C. Hinderlider, that the automatic charts showing diversions through the Laramie-Poudre Tunnel prior to 1926 were destroyed.

Mr. Howell: The defendant State of Colorado objects to the introduction of Complainant's Exhibit No. 19 for the reason that it refers to a matter that apparently occurred prior to the beginning of the present suit; that there is nothing shown in the letter wherein it appears that the party to whom the letter was addressed has any interest in the matter involved in this suit, and that the subject matter of the letter is incompetent, irrelevant and immaterial to any issues in his case.

With reference to this Exhibit No. 19, the inquiries as to the gauge charts were made in connection with my investigation of foreign water coming into the Poudre River at that time. That is Mr. Hinderlider's signature there.

(307) I was endeavoring, during that time of 1926 and later, to learn the amount of Laramie River water coming through the Greeley-Poudre Tunnel.

Cross-examination.

By Mr. Lawrence P. Temple:

With reference to Exhibit No. 16, which purports to be a reply to an inquiry I made with respect to the Lost Lake filings, I really don't remember how long before the date of that letter I had been inquiring with relation to Lost Lake, but I imagine not very long before, because I was [fol. 313] investigating it in 1923 and 1924 regarding a legal right on the river—a storage right. I knew that Lost Lake and Laramie Lake had been in operation on the hill there for some time. I knew in 1912 of the operation of Lost and Laramie Lakes. That is when the first lake was constructed—Lost Lake—in 1912.

(308) I recall personally that the Skyline was built in 1891 or 1893, and there was no construction of either of those lakes at that time. I am just as certain of that as I am of any other part of my testimony in this case.

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(309) JOHN A. WHITING, a witness in behalf of complainant.

Direct examination.

By Mr. James A. Greenwood:

My residence is at Cheyenne, Wyoming, where I have resided almost twenty-nine years. I did not reside in Wyoming prior to my residence in Cheyenne; this has been my home ever since I have been a resident of the state, with the exception of one year when I lived in Carbon County—a temporary absence.

My occupation is civil engineer. I am a graduate engineer, having obtained my degree in 1904. I have followed the occupation of civil engineering and its various branches during my residence in Wyoming the past twenty-nine years. This practice in- (310) cluded the surveying, planning and construction of irrigation projects, which in-

clude canals and reservoirs; the making of water studies and reports, and the planning and construction of municipal improvements. I have pursued that occupation in those various phases throughout the time stated, of twenty-nine years, approximately.

During that time, I was State Engineer of Wyoming from January 3rd, 1927, until April 1st, 1933. As the State Engineer, my duties were to distribute the water of Wyoming among the appropriators, and to assist in the adjudication and determination of water rights. The State Engineer is [fol. 314] the head of the administrative branch as to the regulation of the appropriated waters in this state.

As such engineer and performing those duties, my attention was directed to the conditions upon the Laramie River in Wyoming and to the sources of water that comes into Wyoming through the Laramie (311) River. I first directed my attention to the matters involving the Laramie River and the use of water from that stream and its tributaries in the spring of 1927, shortly after I became State Engineer.

That stream is an interstate stream, and it was with respect to its interstate character of uses by users in another state than Wyoming that invited my attention. Colorado uses the waters of that stream besides Wyoming. Colorado obtains the use of the waters of the Laramie River by their meadow land ditches in the valley of the Laramie River in Colorado, and by means of trans-mountain diversions which divert the water from the Laramie River and tributaries and carry it over into the Cache la Poudre River and tributaries.

My attention was first directed to the necessity of investigating the use of the Laramie River water by Herbert V. Lacey, now deceased; at that time, a lawyer of this city and a partner of Judge Lacey. After my attention had been drawn to the situation, I received a request from the Wyoming users to make an investigation of that matter. (312) I also received complaints as to the practices being pursued on the river with reference to the use of water.

After receiving these complaints and requests, I came to the conclusion that it would be necessary to carry on an investigation to determine whether the trans-mountain diversions and the ditches in Colorado were diverting in excess of their appropriations, and in accordance with the

complaints which had been made to me. After this conclusion, I attempted to institute an investigation.

[fol. 315] My first efforts were to induce the State Engineer of Colorado, and the United States Geological Survey, to form an unofficial commission with Wyoming, my suggestion being that Mr. Hinderlider, the State Engineer of Colorado, would represent the Colorado appropriators and look after their interests, and myself, as State Engineer of Wyoming, would represent the Wyoming appropriators and look after their interests, and that Mr. Follansbee, district engineer of the United States Geological Survey in Denver, Colorado, would act as a third member and conduct the investigations under the direction and with the consent of Mr. Hinderlider and myself. The object of the investigation was to effect an amicable and acceptable method of administration and to correct any defects (313) or erroneous practices, if found to exist, with reference to the use of the water of the river. It was my impression if there were any mis-use of the water, and it was brought to the attention of Colorado, that the State Engineer would regulate the diversion in accordance with the decrees. It was my idea that this study, and the corrections hoped to be accomplished, could best be effected by cooperation between the State Engineer of Colorado, Mr. Follansbee as representative of the United States Geological Survey, and myself.

In anticipation of carrying out this investigation and of securing measurements of diversions, I consulted Mr. Follansbee in Denver as to his availability to participate in the measurements, and discussed the matter with Mr. Hoyt and Mr. Grover, also in the United States Geological Survey in Washington, as to their willingness to have Mr. Follansbee participate, and also, whether they would be able to loan us automatic recording devices to install on the ditches in order to make the proper measurements. The results of those consultations were that Mr. Hoyt and Mr. Grover and Mr. Follansbee were agreeable to the proposition, on condition that no part of the expense would be borne by the United States Geological Survey.

[fol. 316] Mr. Follansbee estimated that the expense would be about (314) $2,600.00 per annum; and after being advised by these representatives of the United States Geological Survey that they could not bear any portion of the ex-

pense, and learning of Colorado's attitude on this same matter, I offered to bear the expense out of the Wloming State Engineer's contingent. In other words, Wyoming would meet the expense necessary to carry on this investigation, without imposing any financial burden on the State of Colorado or the United States Geological Survey. I had funds in my department available for that purpose.

I attempted to effect these arrangements with the United States Geological Survey during the late fall and early winter of 1927-1928. I wrote a letter to Mr. Follansbee on February 27th, 1928, asking him to arrange a conference with Mr. Hinderlider to discuss the matter and to discuss the proposal.

In my plan of investigation, I had in mind the establishing of a method of measuring the volume of water taken from the Laramie (315) River by the Skyline Ditch, the Laramie-Poudre Tunnel, Bob Creek, Columbine, and Lost Lakes —all ditches which were diverting water into the Cache la Poudre valley from the Laramie River and tributaries in Colorado.

I do not recall that I discussed this matter with Mr. Hinderlider prior to February or March of 1928. It was my object to first ascertain whether the United States Geological Survey would participate and be able to loan us the automatic recording devices before I discussed this matter with Mr. Hinderlider. I first took this matter up with Mr. Follansbee by letter on February 27th, 1928, inviting his attention to my desire to effect this commission and make this study.

(Complainant's Exhibit No. 20 marked for identification.)

[fol. 317] (Copy of letter from John A. Whiting, State Engineer of Wyoming, addressed to Mr. Robert Follansbee, District Engineer, U. S. G. S., Denver, Colorado, dated February 27, 1928.)

Complainant's Exhibit No. 20 omitted. Printed side page 1383 post.

(316) Complainant's Exhibit No. 20 is a letter from myself to Mr. Follansbee, dated February 27th, 1928, and requesting him to arrange a conference with Mr. Hinderlider at some time convenient to Mr. Hinderlider and Mr. Follansbee, in order that we might discuss with Mr. Hinderlider the meas-

urements of the trans-mountain diversions between the Laramie and Poudre Rivers. This exhibit is a copy of the letter, the original of which I prepared and signed and put [fol. 318] in the United States mail with proper postage to have it carried and delivered to Mr. Follansbee.

I did not receive any reply to this letter at that time. I received a letter from Mr. Follansbee, advising me that Mr. Hinderlider was in Washington and was not expected back for some time, which I think I have.

(317) Mr. Howell: We object to this line of testimony, which is purely hearsay—it is a matter between this witness and a Government man, and in no way connected with the State of Colorado or the State Engineer's office in Colorado, and has no bearing whatever upon the issues in the case here. It is self-serving, and the witness has testified that he had no conversation and did not have a consultation with the State Engineer Hinderlider of Colorado until March of 1928. This letter, as I gather from your statement, was at least a month prior to that date.

Mr. Greenwood: The letter in question now is dated February 28th, 1928, and the testimony, and the letters in connection with it, are offered to show the development of State Engineer Whiting's purpose to create a commission to study the conditions on the Laramie River, particularly with reference to the trans-mountain diversions into Colorado.

(Complainant's Exhibit No. 21 marked for identification.)

(Letter from Robert Follansbee, District Engineer, United States Geological Survey, Denver, Colorado, addressed to Mr. John A. Whiting, State Engineer, Cheyenne, Wyo., dated February 28, 1928.)

[fol. 319] Complainant's Exhibit No. 21 omitted. Printed side page 1384 post.

(318) Complainant's Exhibit No. 21 is a letter from Robert Follansbee, district engineer, United States Geological Survey, Denver, to myself, dated February 28th, 1928, advising me, in connection with my letter to him of February 27th, that Mr. Hinderlider is still in Washington and is not expected back for at least another week, and advising me that upon Mr. Hinderlider's return, he will arrange a conference.

[fol. 320] Mr. Howell: We object, if the Commissioner please, to the witness reading into the record a matter that

has not been admitted into evidence, and which, from our point of view, is clearly inadmissible as concerning a matter which cannot bind this defendant in any way, and as being wholly incompetent, irrelevant and immaterial. We further move to strike all of this line of testimony concerning a conversation and consultation with respect to officers of the United States Geological Survey; all of it was prior to even a first attempt to confer with the State Engineer of Colorado, and certainly is not binding upon this defendant.

I did not receive any communication from Mr. Hinderlider after having written this letter to Mr. Follansbee, Complainant's Exhibit No. 20. Owing to the delay in receiving a reply, and the fact that spring was approaching, I wrote Mr. Hinderlider a letter relative to this matter.

(Complainant's Exhibit No. 22 marked for identification.)

(Copy of letter from John A. Whiting, State Engineer of Wyoming, addressed to Hon. M. C. Hinderlider, State Engineer of Colorado, Denver, Colorado, dated March 8th, 1928.)

[fol. 321] Complainant's Exhibit No. 22 omitted. Printed side page 1385 post.

[fol. 322] (319) Complainant's Exhibit No. 22 is a copy of a letter from myself to M. C. Hinderlider, State Engineer of Colorado, dated March 8th, 1928.

Mr. Howell: We object to the witness undertaking to read into the record a matter of purported correspondence he may have had with Mr. Hinderlider, which he has testified is a copy and not an original letter.

Mr. Greenwood: At this time we ask the defendant State of Colorado, through its official Mr. Hinderlider, to produce the original.

Mr. Hinderlider: We do not know, until we search, whether we have the original.

Mr. Greenwood: If it is lost——

Mr. Hinderlider: We do not know that it is lost until we have had an opportunity to search for it.

Mr. Howell: With reference to Complainant's Exhibit No. 22, we received no notice until now, just at this moment, that the original of this letter might be desired by the Complainant.

Mr. Greenwood: We have not offered that yet, and will not; we will give you ample time to produce the original.
[fol. 323] Mr. Howell: I would like to put this into the record.

Mr. Greenwood: Surely.

Mr. Howell: If it is desired, that the defendant, through the State Engineer, will have the files of his office examined, and if the original is there, we will produce them. We renew our objection to the reading of this purported copy into the record.

(320) My purpose in communicating with Mr. M. C. Hinderlider, State Engineer of Colorado, was to get him to cooperate in what I termed an unofficial commission or committee with myself and Mr. Follansbee to determine the amount of water diverted from the Laramie River and tributaries to the Cache la Poudre River and tributaries by the transmountain diversions or canals in Colorado.

Mr. Howell: We object, and move that the answer be stricken, for the reason that it is self-serving. You have asked for the original of the letter, to which the letter is supposed to be directed, and the defendant has offered to produce it if it can be located. It seems to me that the evidence of this witness as to the purpose is wholly incompetent, irrelevant and immaterial, and the letter ought to speak for itself.

Mr. Greenwood: The question is not with reference to the letter, but it was with reference to the purpose of the witness Whiting in sending the letter.

After March 8th, 1928, I received a letter from Mr. Hinderlider in reply to my letter.

(Complainant's Exhibit No. 23 marked for identification.)
(Copy of letter from M. C. Hinderlider, State Engineer of Colorado, addressed to Mr. John A. Whiting, State Engineer, Cheyenne, Wyoming, dated March 26, 1928.)
[fol. 324] Complainant's Exhibit No. 23 omitted. Printed side page 1386 post.

[fol. 325] (321) I am unable to find the original letter of March 26th, 1928, I received from Mr. Hinderlider; I find a copy here. The original was received by me and I have made a search for it. I think it is in existence and believe that I can find it.

(322) Referring again to Complainant's Exhibit No. 23, being a copy of a letter of March 26th, 1928, from M. C. Hinderlider, State Engineer, to John A. Whiting, State Engineer of Wyoming, I now have the original of that letter.

(Witness produces letter.)

Mr. Greenwood: We will substitute this for our Exhibit No. 23.

Complainant's Exhibit No. 23 is a letter from Mr. Hinderlider, State Engineer of Colorado, to myself as State Engineer of Wyoming, dated March 26th, 1928. This letter was written in connection with my efforts to create this commission and bring about the study of the Laramie River and the measurement of trans-mountain diversions, in reply to my letter of March 8th, 1928, which is marked "Complainant's Exhibit No. 22".

After receiving that letter of March 26th, 1928, from (323) Mr. Hinderlider, I wrote him another letter on this matter on March 31st, 1928—on this same subject. I do not have the original of that letter. I put it in the mail, addressed to Mr. Hinderlider, as State Engineer, at Denver, Colorado.

(Complainant's Exhibit No. 24 marked for identification.)

(Copy of letter from John A. Whiting, State Engineer of Wyoming, addressed to Hon. M. C. Hinderlider, State Engineer, Denver, Colorado, dated March 31, 1928.)

[fol. 326] Complainant's Exhibit No. 24 omitted. Printed side page 1387 post.

[fol. 327] (324) Complainant's Exhibit No. 24 is a true copy of a letter I mailed to Mr. Hinderlider, written as of March 31st, 1928. It is my recollection that that has been in my possession as State Engineer, and in that office, since the mailing of the original.

Mr. Greenwood: Have you the original of this, Mr. Hinderlider? I know you haven't got it with you.

Mr. Howell: We will be glad to produce the original.

Mr. Greenwood: I know you will, if you have it. I will have it marked and let the record show that the original will be produced if it is in your possession.

[fol. 328] After writing Mr. Hinderlider as of March 31st, 1928, I received a reply, which I have with me and will produce.

(Complainant's Exhibit No. 25 marked for identification.)

(Letter from M. C. Hinderlider, State Engineer of Colorado, addressed to Mr. John A. Whiting, State Engineer, Cheyenne, Wyoming, dated April 2nd, 1928.)

Complainant's Exhibit No. 25 omitted. Printed side page 1389 post.

[fol. 329] (325) This, Complainant's Exhibit No. 25, is the letter I received from Mr. Hinderlider in response to my letter of March 31st, 1928. It is dated April 2nd, 1928, and has reference to the carrying forward of the plan I had for an investigation and study of the Laramie River.

While this correspondence was being carried on between myself and Mr. Hinderlider, I was working on my plan leading up to the installation of gauging devices. and so on, for the purpose of making measurements of the trans-mountain diversions of the Laramie River, and to ascertain the flow of the river, as a part of my general purpose. I wrote Mr. Hinderlider a letter on April 3rd, which was in reply to his letter of April 2nd. I have a copy of it here. That was still (326) continuing this plan I had for creating a commission for the study—working along that line.

(Complainant's Exhibit No. 26 marked for identification.)

(Copy of letter from John A. Whiting, State Engineer of Wyoming, addressed to Mr. M. C. Hinderlider, State Engineer of Colorado, Denver, Colorado, dated April 3rd, 1928.)

[fol. 330] Complainant's Exhibit No. 26 omitted. Printed side page 1390 post.

[fol. 331] (327) That (Complainant's Exhibit No. 26) is a copy of the letter I sent Mr. Hinderlider; the original was addressed to M. C. Hinderlider, State Engineer of Colorado, at Denver, and placed in the United States mail with proper postage on it.

Mr. Greenwood: Do you know if you have the original of this, Mr. Hinderlider? I presume you probably have.

Mr. Howell: We will be glad to produce it if we have it—the original.

Mr. Greenwood: In lieu of filing the original, do you object to substituting a copy?

Mr. Howell: No, if we cannot find the original.

Mr. Hinderlider had set the date of April 5th, 1928, for a conference, and, as I was unable to attend, I wrote to Mr. Follansbee, district engineer of the United States Geological Survey at Denver, asking him to attend the conference. The question that apparently was to be before the conference was how the measurements of the transmountain diversions were to be made; and, as Mr. Follansbee would, [fol. 332] under my proposal, have direct supervision of the installation of the measuring devices and their operation, I judged that he could better advise those attending the conference than myself. I did not attend, (328) although there was a conference held.

I have a copy of the letter I wrote to Mr. Follansbee in regard to the time of this conference and requesting that he attend. The original of this letter, dated April 3rd, 1928, was addressed to Hon. Robert Follansbee, district engineer, United States Geological Survey, 403 New Postoffice Building, Denver, signed by John A. Whiting, State Engineer, placed in the United States mail, and a carbon copy also forwarded to Mr. Hinderlider, State Engineer; and proper postage for transmission was applied.

(Complainant's Exhibit No. 27 marked for identification.)

(Copy of letter from John A. Whiting, State Engineer of Wyoming, addressed to Hon. Robert Follansbee, District Engineer, U. S. G. S., 403 New Post Office Bldg., Denver, Colorado.)

[fol. 333] Complainant's Exhibit No. 27 omitted. Printed side page 1392 post.

[fol. 334] (329) This letter was sent in connection with the plan I had to create this commission and make a study of the river and determine the amount of water in the transmountain diversions.

After writing this letter of April 3rd to Mr. Follansbee, a copy of which was mailed to Mr. Hinderlider, State Engineer, being Complainant's Exhibit 27, which referred to the time of holding a conference and whether Mr. Follansbee would attend that conference, I was later advised as to his attendance and as to the results of the conference. My

recollection is that both Mr. Hinderlider and Mr. Follansbee telephone me after the conference, or during the conference, that the conferees would not consent to my proposal to establish gauging stations on the trans-mountain diversions. As I recall, I did not have any further communications during the year 1928 with Mr. Hinderlider on the subject of the trans-mountain diversions on the Laramie River after the date of the holding of this conference. I had further communication in 1929.

After I was advised that Colorado did not, and would not consent to the proposal to make this study, I came to the conclusion—it was getting late, then, in the season—that the establishment of (330) any station or any further conference would bring it to such a late date that we could not measure all of the trans-mountain diversions, and I therefore dismissed it for the year 1928. I had a further conference with Mr. Hinderlider in 1929.

I employed Mr. Ralph I. Meeker in the winter or spring of 1929, and asked him to secure some hydrographic data from the State Engineer's office, and, upon his request, Mr. Hinderlider wrote me a letter on May 2nd, 1929. This is the letter to which I refer.

(Complainant's Exhibit No. 28 marked for identification.)

(Letter from M. C. Hinderlider, State Engineer of Colorado, addressed to Mr. John A. Whiting, State Engineer, Cheyenne, Wyoming, dated May 2, 1929.)

[fol. 335] Complainant's Exhibit No. 28 omitted Printed side page 1393 post.

[fol. 336] (331) This (Complainant's Exhibit No. 28) is a letter from Mr. Hindlider, State Engineer of Colorado, to myself as State Engineer of Wyoming, dated May 2nd, 1929, and stating that he would like to have a conference at my early convenience in order to discuss the matters of trans-mountain diversion. After receiving this letter, a conference was held at Cheyenne, Wyoming, on May 7th, 1929. My recollection is that Delph Carpenter, of Greeley, and Mr. Hinderlider, State Engineer of Colorado, Mr. Meeker, Mr. Watson, Mr. Lloyd and myself were present; I cannot remember whether the Attorney General's office was represented in that conference or not.

The subject of discussion in that conference was the question of the trans-mountain diversions from the Laramie River to the Poudre River, as regards their legality and rights. There was no agreement or plan of cooperative study and control of the measuring devices and the determination of trans-mountain diversions agreed upon.

There were conferences at a later date—there was a 332 conference held on May 20th, 1929, in Cheyenne. Mr. Hinderlider, Mr. Temple, Mr. Carpenter, Mr. Hamilton, Mr. Watson, Mr. Lloyd, Mr. Wilson and Mr. Greenwood were present. Mr. Hinderlider was present at this conference in his official capacity as State Engineer of Colorado; the Mr. Carpenter I refer to is Delph E. Carpenter of Greeley, Colorado, Interstate Streams Commissioner, at that time, of Colorado. I do not know of my own knowledge whether the other gentlemen from Colorado were officials of the State of Colorado.

The subject of this conference was the continuation of my former efforts. We did not arrive at an understanding of how to proceed. That was on May 20th, 1929. Instead of Mr. Hamilton, it was Mr. Harrison, assistant attorney general of Colorado. There was also present, Mr. Downey, an attorney from Laramie, Wyoming.

At this May 20th conference, we were still unable to effect any plan of procedure acceptable to both states. I remember [fol. 337] (333) we had prepared at that time what we termed "Wyoming's Request." It was a written request, of which, copies were distributed to those at the conference at that time.

(Complainant's Exhibit No. 29 marked for identification.)
(Copy of "Wyoming's Request" presented to those attending conference on trans-mountain diversions at Cheyenne, Wyoming, May 20th, 1929.)

Complainant's Exhibit No. 29 omitted. Printed side page 1394 post.

[fol. 338] (334) That (Complainant's Exhibit No. 29 is a copy of what we termed "Wyoming's Request," and was presented to those attending the conference on the Laramie River in Cheyenne on May 20th, 1929. It was a request in connection with the operation of the trans-mountain diversions in Colorado between the Laramie River and its tribu-

taries and the Poudre River and its tributaries, and was prepared to inform Colorado of what Wyoming considered should be the limitation of the Colorado rights in the river. It is my recollection that copies of these were distributed to the members of the conference.

(Complainant's Exhibits numbered 30 and 31 marked for identification.)

(Letter from M. C. Hinderlider, State Engineer of Colorado, addressed to Hon. John A. Whiting, State Engineer, Cheyenne, Wyoming, dated April 5, 1928; and letter from M. C. Hinderlider, State Engineer of Colorado, addressed to Hon. John A. Whiting, State Engineer of Wyoming, Cheyenne, Wyoming, dated March 12, 1928.)

[fol. 339] Complainant's Exhibit No. 30 omitted. Printed side page. 1395 post.

[fol. 340] Complainant's Exhibit No. 31 omitted. Printed side page. 1397 post.

[fol. 341] (335) This (Complainant's Exhibit No. 30) is a letter from M. C. Hinderlider, State Engineer of Colorado, to myself as State Engineer of Wyoming, dated April 5th, 1928, being the date that a conference was held in the State Engineer's office in Colorado, and pertains to the results of that conference.

Complainant's Exhibit No. 31 is a letter from Mr. Hinderlider, State Engineer of Colorado, to myself as State Engineer of Wyoming, dated March 12th, 1928, referring to the matter of trans-mountain diversions and my proposal to measure the water brought through (336) the various ditches from the Laramie River and its tributaries to the Poudre River and its tributaries.

(335) Mr. Greenwood: Complainant now offers its Exhibits Numbered 20 to 28, inclusive, and 30 and 31, representing the correspondence had between the State Engineer Whiting of Wyoming and the State Engineer Hinderlider and Mr. Follansbee, engineer of the United States Geological Survey, Denver Colorado, pertaining to the efforts of Wyoming to establish a date for conference to work out a plan of procedure to establish automatic gauging devices, and for the purpose of determining the amount of water diverted by the Laramie-Poudre Tunnel to the Skyline

Ditch from the Laramie River to the Cache la Poudre River, and asks that they be received in the record.

Mr. Howell: It is understood that these are admitted subject to our former objections?

Mr. Greenwood: Yes, and that if you have the originals of these copies, they will be substituted.

(336) Mr. Howell: We have no objection to Exhibits 30 and 31.

To the best of my knowledge and belief, Complainant's Exhibit 29 is a true duplicate of the request furnished by Wyoming to the Colorado attendants upon the conference of May 20th.

(Complainant's Exhibit No. 29 offered in evidence.)

[fol. 342] Mr. Howell: The defendant enters its objection to the introduction of Complainant's Exhibit No. 29 for the reason that it appears to be an unsigned statement, and there has been no sufficient evidence showing that a copy of this paper was ever placed in the hands of any representatives of the State of Wyoming or the State Engineer, or that they have ever had any notice of the contents of this unsigned and directed to no one and self-serving paper. It appears to be merely a memorandum, without any indications as to whom may have prepared it. It is incompetent, irrelevant and immaterial to any issue in this case.

The contents of Complainant's Exhibit 29 represents the subject of the discussion at the conference of May 20th; that was prepared by Wyoming officials to present at that conference—prepared before the conference convened, as the subject of discussion. It had been customary, in many of our interstate stream conferences, to prepare (337) a set-up or document showing the requests or conditions, and this was prepared in keeping with the custom.

Mr. Greenwood: We renew the offer, with the further identification.

Mr. Howell: We renew the objection.

After the May conference of 1929, I began an investigation as State Engineer of Wyoming, of the trans-mountain diversions in Colorado to ascertain the measuring devices employed, and their accuracy, and the amount of water transported through those canals per annum. For this

work, I employed Mr. Goyne Drummond, civil engineer, and he was assisted by Mr. Henry Watson, deputy state engineer, Mr. Earl Lloyd, first assistant state engineer, and Mr. Floyd M. Roush, second assistant state engineer. Mr. Drummond and Mr. Watson are the two witnesses who testified in this case.

[fol. 343] I am familiar in a general way with the work that they did in this investigation, which was done at my request and under my direction. Under my direction, Mr. Drummond made measurements of the flow of water in the trans-mountain diversions and made surveys, locating the various canals of the trans-mountain diversion system, and the (338) reservoirs of the Lost Lake system. He was assisted in these surveys by Mr. Watson, deputy state engineer. He also made surveys of the irrigated lands under the Meadowland ditches in the State of Colorado on the Laramie River, and in this, he was assisted by Henry G. Watson, deputy state engineer, and Mr. Earl Lloyd, first assistant engineer.

Besides the inspection of stream flow of the Skyline and the tunnel, Mr. Drummond and Mr. Watson made surveys of other trans-mountain diversion works. They made a survey of the Divide Ditch, diverting water from Sand Creek into Sheep Creek; they made surveys of the Wilson Supply Ditch, diverting water from Deadman Creek into Sand Creek; and also, the Deadman Feeder Ditch, which brought water over from other tributaries of Deadman to the headgate of Wilson Supply Ditch—or Dearman, to be transported through the Wilson Supply Ditch to Sand Creek. They made surveys of the Columbine Ditch, Bob Creek Ditch, and Lost Lake System, as well as surveys of the ditches of the Meadowland diversion. They made measurements of the flow of water being diverted through those various diversion works.

These investigations have been continued ever since, and, as a result of these studies and information gathered through this investigation, I came to the conclusion in the spring of 1930 (339) that the trans-mountain diversions were diverting water in excess of the decree of the United States Supreme Court in the case of Wyoming vs. Colorado, et al., in which the first decree was entered June 5th, 1922, and that there were certain illegal ditches which were also diverting water from the Laramie River and tributaries

[fols. 344-347] to the Cache la Poudre River and tributaries.

After reaching this conclusion, and in order to bring the matter to the attention of the officials of the State of Colorado, the officials of the State of Wyoming, consisting of the Governor, the personnel of the Attorney General's office, and the State Engineer's office, had a conference and prepared a statement or request on June 21st, 1930, which they forwarded to the Colorado officials.

(Complainant's Exhibit No. 32 marked for identification.)

(Copy of letter or request prepared by the Governor, State Engineer and Attorney General of Wyoming, addressed to Hon. Williams H. Adams, Governor of Colorado; Hon. M. C. Hinderlider, State Engineer of Colorado; Hon. Robert E. Winbourn, Attorney General of Colorado—at Denver; and Hon. Delph E. Carpenter, Commissioner for Colorado, Greeley, dated June 21st, 1930.)

Complainant's exhibit No. 32 omitted. Printed side page. 1398 post.

[fol. 348] (340) That (Complainant's Exhibit No. 32) is a copy of a letter or request prepared by the Governor of Wyoming, the State Engineer of Wyoming, and the Attorney General of Wyoming, and sent to William H. Adams, Governor of Colorado, M. C. Hinderlider, State Engineer of Colorado, Robert E. Winbourn, Attorney General of Colorado, and Delph E. Carpenter, Commissioner of Colorado. This letter is dated June 21st, 1930, and signed copies of this Exhibit 32 were placed in the United States mail, addressed to those enumerated Colorado officials.

Mr. Greenwood: I suppose you have originals of that. Have you any objections to that on the ground that it is a copy?

Mr. Howell: We have no objections on the ground of it being a copy.

(Complainant's Exhibit No. 32 offered in evidence.)

I received a direct reply to the letter, Complainant's Exhibit 32, from Delph E. Carpenter, Interstate Stream Commissioner for Colorado at that time, at Greeley, Colorado; and also, a letter addressed from the State officials of Colorado to the State officials of Wyoming. I have the original of the reply from the State officials of Colorado to the State officials of Wyoming; I do not seem to find the other one.

(Complainant's Exhibit No. 33 marked for identification.)

(Reply to request of Wyoming, prepared by the Governor, State Engineer, Attorney General and Commissioner for Colorado, addressed to Hon. Frank C. Emerson, Governor of Wyoming; Hon. John A. Whiting, State Engineer and Interstate Streams Commissioner of Wyoming; and Hon. William O. Wilson, Attorney General of Wyoming; dated July 28, 1930.)

[fols. 349 & 350] Complainant's Exhibit No. 33 omitted. Printed side page 1403 post.

[fol. 351] (341) (Complainant's Exhibit No. 33 offered in evidence.)

Those photographs, Complainant's Exhibits Nos. 11, 12, 13, 14, and 15, were taken by me on June 16th, 1932. James A. Greenwood, Attorney General, Goyne Drummond, assistant engineer to the State Engineer's office, Richard Jackson, deputy Attorney General, and Henry G. Watson, deputy State Engineer, were present with me when those were taken.

Mr. Greenwood: Complainant now offers its Exhibits 11 to 15, inclusive, the same ones of which Mr. Watson testified yesterday.

After the spring of 1930, further effort was made on behalf of Wyoming to hold a conference for the purpose of coming to an understanding with reference to the rights of these two states in the waters of Laramie River. On September 26th, 1930, a conference was held between the Colorado officials and Wyoming officials at Greeley. Those pres-[fol. 352] ent at the conference for Wyoming, as I recall, were William O. Wilson, Attorney General of Wyoming, and James A. Greenwood, deputy Attorney General, and myself; for Colorado, Delph E. Carpenter, of (342) Greeley, and state officials from the State Engineer's office and Attorney General's office—I cannot recall just exactly who was there.

Nothing was accomplished toward reaching an agreement there, and that was the last conference or attempt at a conference that was held. I still continued further investigations. Mr. Drummond, Mr. Watson and Mr. Lloyd finished making plane table surveys of the irrigable area on the

Meadow land diversions, and Mr. Drummond made stream measurements there afterwards from time to time.

The Meadow land acreage in the State of Colorado, in the Laramie River Valley, being irrigated from Laramie River water was approximtely 4,200 acres; I cannot remember the exact amount. It was pretty close to 4,250 acres mentioned in the original proceeding.

I graduated from the University of Michigan in 1904 as a civil engineer.

Mr. Howell: There is no cross-examination of this witness.

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(343) ELMER K. NELSON, a witness in behalf of complainant:

Direct examination.

By Mr. James A. Greenwood:

I reside at Laramie, Wyoming, where I have resided for twelve years. I resided at Cheyenne about five years prior to that, and west of Laramie—Medicine Bow and Rawlins—about five years prior to that. My profession at the present time is civil engineering; I am a graduate engineer of the University of Nebraska, and the University of Wyoming. I took my degree at the University of Wyoming in 1925; the work was at both schools.

[fol. 353] Prior to my graduation from Nebraska and the study of civil engineering in that institution, my general education consisted (344) of about three and one-half years of University work,—not in addition to my engineer's course; that was the engineering course prior to the time I received a degree.

Since my graduation, I have been engaged in commercial and civil engineering in this state more or less constantly. During 1916 and 1917, for about a year and a half, I was an assistant in the State Engineer's office of Wyoming. I took my three and a half years of civil engineering prior to my graduation in 1912 to 1915. Since 1915, I have been practicing engineering as a graduate civil engineer.

I am familiar with the water-shed of the Laramie River. My practice as a civil engineer has been directed chiefly in connection with hydraulics and applied hydraulics. I was

instructor of civil engineering at the University of Wyoming for three years, approximately— (345) a year and a half in 1925 and 1926, and for another year and a half in 1930 and 1931. I have had experience in measurements of stream flow and determination of the measurements of water of irrigation ditches and canals, occasionally since 1912—a part of the time as engineer for irrigation companies; part of the time doing special work for the State Engineer's office of Wyoming.

I am familiar with the Laramie River and its water-shed both in Colorado and Wyoming, from its source down to where it departs from the State of Wyoming. I have made particular study or observations of the water-shed of the Laramie River. The first time I had occasion to interest myself in that was in the summer of 1919, in the general practice of engineering, doing work for irrigated land owners in Laramie Valley. The nature of my study at that time was an analysis of the run- (346) off and available water for later rights, to determine the quantity of available water for irrigation.

[fol. 354] I think the next time I did any work on Laramie River was in the summer of 1922. The work that season was done for an association of water users in the Laramie Valley in Wyoming, in connection with runoff and storage. I studied the records that were available and made some observations for my employers at that time, and also, for the State Engineer's office. I studied the records of the United States Geological Survey, and the records in the biennial reports of the State Engineer of Wyoming, and some records which I, myself, made from my own observations and surveys.

I continued this study that I commenced in 1922 for a period of about three or four years. I made a record of my study—in 1925, I made a particular study of the water resources of this upper Laramie River basin, which included the whole area in Colorado, as well (347) as in Wyoming, and made a compilation of such study. That study was made for the purpose of finding out, not only as to the quantity of water which was measured or came into the valley, but the manner in which such runoff took place—a study of conditions as they had been.

I did some work and gathered some data as to the headwaters of the Laramie River for the State of Wyoming. In

the summers of 1922, 1923, 1924 and 1925, I made some observations and measurements for the State Engineer of Wyoming. Frank C. Emerson was the State Engineer at that time.

I made a compilation of the annual runoff of water available for irrigation passing the state line station on the Laramie River at Jelm. I have completed an analysis of this flow for a continuous period from 1911 to 1932, inclusive.

(Complainant's Exhibit No. 34 marked for identification.)
(Table prepared by Elmer K. Nelson showing annual recorded flow of Laramie River at Jelm, Wyoming.)

[fol. 355] Complainant's Exhibit No. 34 omitted. Printed side page 1406 post.

[fol. 356] (348) This, Complainant's Exhibit No. 34, is a table prepared by me and shows the annual recorded flow of Laramie River at Jelm, Wyoming, in acre feet, from the records of the United States Geological Survey and biennial reports of the State Engineer of Wyoming, with monthly extensions where the records are not complete. The method of obtaining those extensions where the records are not complete, was adopted after studying all available records of flow. There are some years during which complete records are available throughout all months of the year. Knowing the character and distribution of the runoff in such a year, and knowing its relation to other years within the same period, and having available such information as could be had relating to precipitation, both snow and rain and snow measurements, I was able, I think, to secure a reasonable and logical method for arriving at this late fall, winter and early spring months' flows.

The first column in this compilation, Complainant's Exhibit 34, where I have a "period year", means that of this twenty-two year period, by going in that column, you can pick out thirteen, ten, or any number of years in that column beginning from the first; in my first column, that represents the first year of my compilation, and the mean runoff that year as found in this column where I have on (349) my fourteenth line, 143,700, represents the mean runoff in acre feet at the end of 1924.

Following that column on down, we have 135,560, which represents the mean runoff of the twenty-two year period,

from one to twenty-two. In my fourth column, the figures appearing there from the first to the twenty-second year represent the runoff in acre feet; and in my fifth column, entitled "runoff index mean 143,700," that is called the runoff index related to a mean of 143,700. The percentage appearing below shows the relation of any year to this mean over that period of time.

[fol. 357] The "mean index at year" in my sixth column is made to carry out some further comparisons. It shows that the runoff of all the years prior to any year—the mean runoff—it shows its relation, stated in per cent, to this same mean which we speak of in column five, 143,700 acre feet, whether it is more or less.

The last column, "per cent variation from mean, accumulative," shows the per cent variation from the mean flow at the end of any calendar year. I have a plus or minus sign appearing (350) opposite those figures, which indicates whether it was less than the mean or more.

The first line at the bottom, "mean annual runoff of period from 1911 to 1924, 143,700 acre feet"—that is the compilation of the average I found as a mean for those years between 1911 and 1924; and the same would be true as to the mean annual runoff of the period from 1911 to 1932, as representing a mean runoff of 135,500 acre feet. The last line shows the same mean annual runoff for the period from 1923 to 1932, inclusive, being 128,070 acre feet.

My study indicates that this was the mean average flow passing the Colorado-Wyoming state line measuring station in those years. Referring to my last column on this exhibit with reference to these percentages, as to the accumulative feature of that compilation or representation, since the runoff index is a comparison of relation, stated in per cent, of any year to the mean of a certain period, then these additions accumulated will represent total variations from this same mean. (351) For instance, an accumulation of a two year period would be 200—if the sum of the index would be less than 200, then the variation would be negative by the difference between the sum of such indices and the number 200, and so on, for any number of years. For ten years, it would be the difference between the sum of those indices and the number 1,000; and so on. That is indicated by my sign, whether plus or minus, opposite the figure showing the percentage for that year.

[fol. 358] I obtained the —125.0 for the year 1932—based upon this mean, which has been given, and beginning with the period at 1911 up until the end of 1932, the stream has become deficient 125 per cent of this mean of 143,700 acre feet. That is what this —125.0, my last figure in my last column, represents—a deficiency for that year, figured over the total number of years.

Explaining further in detail the plus and minus features of this percentage column, column 7, we take any period of years which are continuous and derive an average runoff for such period, and if we assume that a stream may run off uniformly and continuously throughout the whole period, at the end of which the total runoff will be the same, then we can compare what actually took place with the mean runoff, and the per cent of variation from the mean is given on this table for annual periods only, based upon the mean shown on the table; and it (352) shows whether it is less or greater than the mean, in the plus or minus. For example, take at the end of 1916, all of the runoff for the previous six years was 32.6 per cent below the average runoff for the whole period—I mean by the average runoff, the average accumulated runoff.

The Jelm station is located just in Wyoming, a short distance from the Wyoming-Colorado state line. I would not say exactly how far—I should say less than one mile. It is known as the stateline station, and the measurement of water at that point would represent the Colorado runoff from the Laramie River.

I made a similar compilation of runoff from the Laramie River at what is known as Woods Landing, or Woods Station.

(Complainant's Exhibit No. 35 marked for identification.)

(Table prepared by Elmer K. Nelson showing annual recorded flow of Laramie River at Woods, Wyoming.)

[fol. 359] Complainant's Exhibit No. 35 omitted. Printed side page 1407 post.

[fol. 360] (353) Complainant's Exhibit No. 35 is a table which I prepared showing the annual recorded flow of the Laramie River at Woods, Wyoming, in acre feet, and it has been prepared from the records of the United States Geological Survey and the biennial reports of the State

Engineer of Wyoming, with extensions by mean monthly and annually where the records are incomplete. This table covers the continuous period of 1911 to 1932, inclusive. It shows a mean runoff at the end of the first fourteen years of 168,000 acre feet, and a mean runoff of the twenty-two year period of 158,240 acre feet. The 4th column shows the annual runoff in acre feet for each calendar year; the 5th column shows the runoff indices; the last column shows the per cent variation from the mean, accumulative.

This was obtained in the same way as I explained with reference to Exhibit No. 34, and the years that I represent as being embraced in the period of my study are from 1911 to 1932, inclusive. When I say "the first fourteen years," I mean from 1911 to 1924. I find by my study, and my memorandum indicates, the mean annual runoff for the period from 1911 to 1932, inclusive, to be 158,240 acre feet. (354) The mean annual runoff for the period from 1911 to 1924, inclusive, is 168,000 acre feet; the mean annual runoff for the period from 1923 to 1932, inclusive, is 149,960 acre feet.

These Exhibits 34 and 35 were made up by me during this month from the sources of information which I stated —my own study, consultation and information gathered from the United States Geological Survey records and Wyoming records from the Engineer's office.

Referring again to the last column in Exhibit 35 showing the percentage variation from the mean, as to how I arrived, for instance, at the first figure—I have a minus 11.6 in my first entry, and the next is a plus 13.8—the first year of this period is but 88.4 per cent of the mean used, and upon which these indices are based, that mean being 168,000 acre feet. The difference between 88.4 per cent and 100.0 per cent, [fol. 361] which it would have been if the river had been flowing at its average rate of flow during the year, is 11.6 per cent, which is negative. In other words, the first year's flow, which is 148,500, is 11.6 per cent less than the 168,000. (355) The next year is 125.4 per cent of the mean flow, but taking into account that we had a deficiency the previous year, the net accumulation shows that the runoff for the two year period has been 13.8 per cent above normal. In other words, the 11.6 is charged into the second year, and leaves a net of 13.8. It has to absorb the loss of the first

year, and so it is graduated down in that same method all the way through.

I made a similar study of the annual recorded flow of the Little Laramie River at what is known as Filmore Station, Wyoming.

(Complainant's Exhibit No. 36 marked for identification.)

(Table prepared by Elmer K. Nelson showing annual recorded flow of Little Laramie River at Filmore, Wyoming.)

[fol. 362] Complainant's Exhibit No. 36 omitted. Printed side page 1408 post.

[fol. 363] (356) Complainant's Exhibit No. 36 is a table prepared by me and shows the annual recorded flow of the Little Laramie River at Filmore, Wyoming, in acre feet, from the records of the United States Geological Survey and biennial reports of the State Engineer of Wyoming, with extensions monthly and annually where the records are incomplete.

From that study, as shown by this Exhibit No. 36, I get 82,400 acre feet as the mean annual runoff from the Little Laramie River for the period of years 1911 to 1924, inclusive; for the period 1911 to 1932, I get 86,300 acre feet as the mean annual runoff from the Little Laramie River; and for the period of years from 1923 to 1932, inclusive, the annual runoff from this stream, the Little Laramie, is 78,700 acre feet. That represents the compilation taken from a study of the year 1911, as the first year, to 1932, as the last year, or a total of twenty-two years.

The percentage of accumulation in my last column is obtained in the same way as I have explained with reference to Exhibits 34 and 35; and from that percentage, the twenty-two year period would show —103.0 of the annual mean.

Referring to Exhibits 35 and 36, in my compilations (357) there are some years in which I refer to them as annual extensions in which records are not available, and explaining further how I arrived at those extensions in my compilation—referring to Exhibit 35, there is a continuous record of runoff of the Laramie River at both Woods and Jelm gauging stations of fourteen years, and there are records

of runoff at both stations for the year 1932. Comparing the runoff for those years, I have been able to choose representative amounts for the years at Woods during which no records were kept, these being derived by comparison of the Woods and the Jelm gauging stations for the years when both records were available, and it being assumed that they would maintain a similar relationship throughout the years which were filled in or extended. That explanation applies to each of the tables where I made an annual [fol. 364] extension when the record was not available, except for the Filmore station there is a sixteen year continuous record, being the first sixteen years of this 1911 to 1932 period, which are directly comparable.

The Woods station is located in Wyoming approximately eight miles down stream from the Jelm station; the Filmore station is (358) located near where the Little Laramie enters into the valley and below all of its tributaries, including the South Fork, Middle Fork and the North Fork drainage areas. The Woods station is located very near the upper end, or the beginning, of the irrigated area in Wyoming; it is at the head of that area.

Exhibits 34, 35 and 36 represent a study made by me only. I have not consulted any other engineer in connection with this work; I have consulted the results of official records, is all. The particular purpose that I went to the headwaters of the Laramie River in 1922 was to note or measure, if necessary, quantities of water being diverted by what is known as the Greeley-Poudre Tunnel, I believe, and the Skyline Ditch. It was at the request of the then State Engineer, the late Frank C. Emerson.

(359) I went to the headwaters for that purpose more than one year and made more than one observation or study each year. I cannot recall how many in the different years I was there; my record was sent in to Mr. Emerson after each trip, but I presume three or four times in each summer of those years I mentioned.

(Complainant's Exhibits numbered 34, 35 and 36 offered in evidence.)

Mr. Howell: The defendant objects to the introduction of Complainant's Exhibits 34, 35 and 36 for the reason that the witness has testified that they were computed from Government records and records on file in the engineer's office

of Wyoming, and also from records taken from the several [fol. 365] stations mentioned in the three exhibits, and are mere calculations, the whole computation in each of these exhibits being merely a conclusion of the witness, and the defendant is entitled to the original records that may have been used in order to determine (360) the value of the computations covered by the three exhibits. We also move that all of the testimony heretofore given by the witness be stricken from the record.

(End of Volume I of Transcript of Testimony)

(453) Cross-examination.

By Mr. Shrader P. Howell:

Exhibits 34, 35 and 36 purport to represent the flow of the Laramie River at Jelm, Wyoming, and also the flow of the same river at Woods Landing in Wyoming, and the flow of the Little Laramie River at Filmore, Wyoming, for the years 1911 to 1932, inclusive. I have divided that period of twenty-two years into two parts, the first extending from 1911 to 1924, and the second from 1925 to 1932, inclusive. The first period from 1911 to 1924 covers a period of fourteen years; the second period from 1925 to 1932, inclusive, covers a period of eight years.

(454) In my exhibits, I have used the mean flow of the first period as a measure of the runoff, in which case I conclude that at the end of 1932, there was an accumulated deficiency of 125 in the flow of the Laramie at Jelm, an accumulated deficiency of 128 per cent in the flow of the Laramie at Woods Landing in Wyoming, and an accumulated deficiency in the flow of the Little Laramie at Filmore of 103 per cent for the same period. The flow for the first period, 1911 to 1924, was used as a standard; the indicated deficiency at the end of 1924 was zero; and the large accumulated deficiency shown on my exhibits occurred since 1925.

Turning to Exhibit 34, the 4th column, I stated that in order to arrive at the values given in column 4, it was necessary to estimate the flow of the streams for various [fol. 366] months for which there was no record. I would have to consult my original notes to see if, out of the total period of twenty-two years, or 264 months, from 1911 to

1932, there were 96 months of that period for which no record whatsoever exists of the runoff of the Laramie at Jelm. I could tell you the (455) years which were complete, and those which were not complete. I think I will have to consult some of my original notes as to the number of months in which there was no record at all of the flow at Jelm. In 1911, the first five months were either incomplete, or only partially complete; the first four months were missing entirely, and in the fifth month, some of the first days were missing and the total amount was adjusted to take care of the missing flow record. I would have to take a few moments to figure out the number of months out of that 264 in which there were no records.

In addition to the months for which there were no records available of the runoff at the Jelm station, there were also some months—not many—when only a partial record existed of the runoff at Jelm. I can ascertain from my records the exact number of months, which I will (456) do.

I find from my notes there were 45 months out of the total of 264 months, or a twenty-two year period covered by my investigation and report, as disclosed by Exhibit 34, for which no record at all was given, and that there were 7 months of which only a partial record was shown.

Turning to Exhibit 35, which purports to show the flow of the Laramie River at Woods Landing, Wyoming, from 1911 to 1932, including the years 1925 to 1931, my notes show that there were 127 months for which no record was found. In this case, it includes seven full years in which there were no records available. I find in addition to the months to which I have just testified, there were 8 months of the period in which there were only partial records of the flow at Woods Landing.

[fol. 367] I cannot say exactly how far Woods Station is from the Colorado line; it is approximately ten miles. The diversion of the (457) Pioneer Canal is located at the gauging station. The gauging station near Woods is at the diversion, as I recollect: I have not been there for some time, and there may have been changes made in the method of measuring and keeping those records that I would not know of.

My records of the flow of the stream include the diversion of water made through the Pioneer Canal, and so do the official records which I have referred to.

Turning to Complainant's Exhibit No. 36, which purports to show the flow of the Little Laramie River at Filmore, Wyoming, for the period of 1911 to 1932, inclusive, there were some months during the total period of 264 months covered by the table for which no record whatsoever exists. I found six full years for which there were no records of the runoff; and in addition, there were five months for which there was only a partial record. I also found that there were, in addition to the six full years for which there was no record, twenty-nine (458) additional months for which there was no record.

The values given in column 4 of each of the exhibits, 34, 35 and 36, as to the annual flow of the river at each of the points designated in the exhibits, are not my estimates or conclusions in all cases. Where the record is complete, that is the number representing the runoff shown by the record of flow; but where the record is incomplete, in the months as I have testified, and the years as I have testified to heretofore, then the values as represented in column 4 of the three exhibits are the conclusions which I have drawn. Those conclusions—limiting the question to the months and years for which no records or only partial records exist—are based upon estimates and conclusions made by me. The final conclusions, as shown by these three exhibits, for the missing years and months are, as a matter of fact, based upon my investigations.

[fol. 368] The principle that streams originating in the same general locality have the same general characteristics of runoff depends on the size of the locality and its general position regarding other localities that may be adjacent to it. I think, as a general proposition, that it is generally accepted that streams originating in (459) the same locality, under comparatively the same climatic conditions, altitude, and so forth, will have the same general characteristics as to runoff.

I did not use this principle by assuming that there was a direct relation between the character of the flow of the Little Laramie and the Laramie proper. The flows that actually had taken place during a contemporary time, were probably representative of what the extensions would bear to the flow which was continuous when another flow had ceased. That is to say, the relation that those streams had to one another during periods when the record was complete would

guide the extension of the record to years that were not complete. I did not compare or take into account in any way the drainage areas or the comparative locations of those drainage areas, but took into account what had actually taken place in runoff. As a result of my investigations and calculations, I did find that there was a definite relation.

The Laramie River above Jelm and the Cache la Poudre River in Colorado rise in the same general locality; the drainage areas touch. The water-sheds are not divided by the Continental Divide, (460) but by low hills, for a certain distance. The Cache la Poudre water-shed lies south and east of the very upper headwaters of the Laramie River. The Laramie River would be on the north and west side. They do not originate, practically, from the same range of mountains; that line along which their drainage areas are touching, I would say would be the main range of mountains. I do not recall whether the altitudes are somewhat the same, and cannot say as to the climatic condi- [fol. 369] tions or precipitation. I do not know whether it would be natural to assume that, in view of the location of the sources of these two rivers in the mountains, there is a somewhat close relation between the characteristics of the flow of the two streams.

Referring again to Exhibits 34, 35 and 36, it is a fact that the flow of a stream in any locality varies from year to year, sometimes between fairly wide limits, due to natural causes. Variation in annual rainfall, snowfall, wind movements, and so forth, all (461) have their effect on the annual runoff. I do not think we have records enough to feel confident to say that the stream flow not only varies annually, but there are periods of high and low cycles of variation. I have not studied the record sufficiently to answer as to whether the records disclose that there are series of years in which the runoff would be exceptionally large and, likewise, apparently a series of years in which the runoff will be exceptionally low.

Exhibits 34, 35 and 36 disclose that there are periods of years in which the runoff has been quite large, and also, several years in which the runoff has been exceptionally low. That is true of each of the exhibits. It is always true that the occurrence of one or more years of very high runoff, or the occurrence of one or more years of exceptionally low runoff would tend to raise or lower the mean for the

period covered by the investigation by reason of some years in that (462) period being exceptionally high, and some years in that period being exceptionally low, so that the mean would not represent a true normal runoff. It depends on the mean and the period used as to whether the mean could be reduced less than a hundred per cent below the mean for the period under investigation. If you ascertain the mean or average for a certain period, and then find one year or more in which the annual runoff is exceptionally low, I do not see why, as a mathematical proposition, it could not be reduced more than a hundred per cent. After a mean is determined for a particular period, the runoff of any single year within that period would not, and cannot [fol. 370] be lower than one hundred per cent of the mean. In other words, if the flow is zero, it would be just one hundred per cent below the mean. I believe the flow cannot be less than zero. The mean flow of any period depends upon what is used in building up the period, and any variation of any annual flow from such a mean would affect the departure from that mean. I would (463) hesitate to say, and am not prepared to answer as to whether it would be possible for the runoff for some of the years on any stream within the period to be more than one hundred per cent greater than the mean.

Complainant's Exhibit No. 34 for the period of 1911 to 1924, that I have used in my report as a sort of yard stick to determine the character of the runoff for each of the years from 1911 to 1932, and particularly to show the large indicated accumulated deficiency in the runoff of 1925 to 1932, inclusive, contains one year of very high runoff—that is, the year of 1917. I do not know whether the runoff for the year 1917 was one of the highest of record for all of the Rocky Mountain region. As to whether the runoff of the Cache la Poudre River was the highest in 1917 of any year since 1885, I have not studied the characteristics of the Cache la Poudre in this connection; and I do not know whether the runoff for 1917 was the highest of record since 1900 in the Colorado River Basin above Glenwood Springs. I do not know whether (464) the runoff of the North Platte River at North Gate, near the Colorado-Wyoming state line, was the highest since the keeping of the records of the flow of that stream, which started in 1916. As to whether the record of the Rio Grande at Del Norte in the

year 1917 was the second highest of record since 1890, I cannot answer that.

I would not say that Exhibit 34, particuarly the second period from 1925 to 1932, for which period I show a large accumulated deficiency in runoff, contains three years of exceptionally low runoff. I believe that in a study of this sort [fol. 371] of streams, no year is exceptionally low—that those can be expected, not as exceptions, but as a general rule. Referring to Exhibit 34, I would consider the runoff, as indicated thereon for the year 1931, as quite low compared with the mean flow.

As to whether it is true that the year 1931 was one of the lowest of record in the Rocky Mountain region of stream runoff, I do not know. I have not investigated the run-off of the Cache la Poudre (465) for the year 1931 as to whether it was the second lowest annual runoff since 1884. I do not know whether it is true that the runoff of the Colorado River at Glenwood Springs in 1931 was the lowest of record in that basin, or whether it is also true that the runoff of the North Platte at North Gate, near the Colorado Wyoming state line, in 1931 was the lowest of record for that stream.

As to your question, "While there are other years of exceptional runoff disclosed by Complainant's Exhibit 34, for the period between 1911 to 1924, such as 1921, a year of floods throughout the Rocky Mountain region, yet if we ignore those years and eliminate from the series only the exceptionally high year of 1917 and the exceptionally low year of 1931, what would be the mean flow for the period of 1911 to 1924?" I have only made such calculations as are shown on the exhibit. I do not know whether approximately the mean flow for the period covered, under the conditions stated in the preceding question, would be about 136,385 acre feet. I have not made the calculation to determine what the mean flow would be for the period covered by Exhibit 34, from 1911 to 1932, if the years of 1917 and 1931 are eliminated, and I cannot say that it would be approximately 133,980 acre feet. It would not take very long, by using the data on this exhibit, to make the calculation covering the answer to those two questions.

(466) Mr. Greenwood: I think we will object to that. It is not any part of the table. If that is a calculation that counsel desires they have engineers who can make that, and it does

[fol. 372] not prove or disprove anything as to the testimony given by this witness on direct examination, based upon the data he disclosed.

Mr. Howell: It is based upon Exhibit 34, which was prepared by this witness and introduced by counsel on his examination in chief.

Mr. Greenwood: I will say it is based upon a hypothetical proposition which counsel has deducted from the table which this witness has identified and set up.

I have not calculated to determine whether that would represent the mean for the period of 1923 to 1932, as shown by my exhibit, if the year of exceptionally low runoff, namely, that for 1931, is eliminated. I do not know that the runoff, under the limitations stated, would be approximately 133,428 acre feet.

The mean annual runoff for the period of 1911 to 1924, as shown in my table, Exhibit 34, to be 143,700 acre feet, is correct; and a mean annual runoff of 135,560 acre feet for the period of 1911 to 1932; and, likewise, a mean annual runoff of the period of 1923 to 1932 as 128,070 acre feet.

(467) Referring again to the table in Exhibit 34, the manner of arriving at the mean for the years 1911 to 1932, as represented by the data in column 4, has nothing to do with the departure of any year from that mean. I certainly do not mean to state that the occurrence of floods or exceptionally high runoff for any year during the period under consideration, or exceptionally low runoff, would not tend to affect the general mean that was determined for the period, or from 1911 to 1932. In other words, if there are certain years in which there was exceptionally low runoff, or exceptionally high runoff, that fact would influence and be reflected in the deviation from the normal for the period.

I know that a gauging station has been maintained for a long time on the Cache la Poudre River at or near the point [fol. 373] where it (468) leaves the mountains. If the United States Geological reports and the reports of the State Engineer of Colorado show that the station has been maintained there since 1884, that would be generally accepted as to the history of the station. I have no direct knowledge as to whether, assuming it to be a fact that the station referred to has been located on the Cache la Poudre River at the point where the river leaves the mountains since 1884, all water diverted to the Cache la Poudre from the Laramie would pass such gauging station and be measured at that point,

together with the water originating in the Cache la Poudre basin above such gauging station.

If, upon analyzing the flow of the Cache la Poudre River as it has been measured where it leaves the mountains, for a period of 1911 to 1932, using the same methods I used on Exhibits 34, 35 and 36, it is found there is an indicated deficiency of 127 per cent, which is directly comparable to the 125 per cent which I found for the Laramie River at Jelm, and the 128 per cent I found for the Laramie River at Woods Station, Wyoming, that would not necessarily indicate that such accumulated indicated deficiency in runoff was due entirely to natural causes.

The water in the Laramie River flowing past Woods Landing in Wyoming, as shown by Complainant's Exhibit 35, and the water originating in the Little Laramie basin above Filmore, Wyoming, as shown by Complainant's Exhibit 36, very nearly represent the total water supply (469) from the Laramie River available for use by Wyoming. I do not know as to whether the drainage area of the Laramie River above Woods Landing, plus the drainage area of the Little Laramie River above Filmore, Wyoming, is about 12½ per cent of the total drainage area of the Laramie River basin, or as to whether it is true that the total of the remaining 87½ per cent of the drainage area of the Laramie River lies wholly within the State of Wyoming.

I presume there are other tributaries entering the Lara- [fol. 374] mie in the State of Wyoming besides the Little Laramie, but I cannot enumerate all of them. I do not recall that Chugwater is a tributary of the Laramie in the State of Wyoming. The Sybille and the North Laramie River are tributaries of the Laramie in the State of Wyoming.

I did not make any investigations as to the runoff of either of those streams. I have made no computation as to the annual (470) runoff of either the Chugwater, the Sybille, or the North Laramie, or other tributaries of the Laramie in the State of Wyoming. I have no knowledge of the mean yearly outflow at the mouth of the Laramie River.

Redirect examination.

By Mr. James A. Greenwood:

The conclusions I reached from my study, as indicated by Exhibits 34, 35 and 36, were based upon estimates which

were included with actual facts and figures. As to my final conclusions being based wholly upon estimates, I believe I stated they were based upon calculations and computations —partly from estimates. I would hardly consider the word "estimate" applying to these studies; I call them "calculations". (471) They are only a portion of the total flow record.

In Exhibit 34, the amounts that have been calculated to complete yearly flows represent less than 5 per cent of the total runoff arrived at at the bottom of column 4. Regarding Exhibits 35 and 36, the monthly extensions which have been made to complete the incomplete yearly records, and not including the years for which no records were available, amount also to less than 5 per cent of the total at the bottom of column 4 of Exhibit 35. On Exhibit 36, similarly, for the Little Laramie at Filmore, such monthly extensions aggregate only about 3 1/3 per cent of the total at the bottom of column 4. The percentages of course, do not include the years for which all of the runoff was calculated.

I was interrogated at length as to the last column appearing in these exhibits, and asked the question if it was [fol. 375] physically possible for me to obtain a greater minus per cent than a hundred per cent of the mean for any one year, and I answered in the affirmative, that it was not possible to do that. Referring now to the column of Exhibit 34, under the heading "per cent variation from mean accumulative," in employing that system of percentage over the period of years involved, it would be possible to have a hundred per cent, two hundred per cent, or a thousand per cent below the mean, if the river was flooding at the end of a period of time. That column is quite comparable to a deposit in a bank—it will be up or down, according to (472) the way you draw on it.

After determining the mean from the figures I used over the number of years in question, for instance, from 1911 to 1924, and getting 143,700 acre feet as a mean flow, if you have a year that runs below that, you have a minus percentage in the final column. If you have a year that runs two hundred thousand acre feet following, it might absorb that minus and give you a plus percentage. Two such years following immediately after 1924 would do that. The accumulated percentage there represents the fluctuation in plus and minus flow of the river at that

point over the number of years in question, and I finally wind up with 125 per cent minus. It might be possible for a stream to flow in a given year one hundred per cent, or even more, above the mean.

As to the effect on the amount of water that would appear at the Jelm station, or at the station near Woods, as to the quantity of water that would pass in a given year if there was diverted from the source of that river above those stations, 26,000 acre feet of trans-mountain diversion, for instance, as against a diversion of 18,000 acre (473) feet—if the 26,000 was taken, the amount of water that reached one of these stations would be less than the amount that would reach there if only 18,000 were taken, if it was taken for similar years. In other words, whatever amount is diverted above those stations for trans-mountain diversion, will depreciate the volume that arrives [fol. 376] at those stations.

If a number of diversion works, for instance, one called the Bob Creek Ditch, one called the Columbine Ditch, and the system called the Lost Lake System, and the Wilson Supply Ditch, were all constructed to divert water from the Laramie River watershed to the Cache la Poudre watershed, the amount of water that would eventually pass Woods Landing or Jelm station, if those diversions were above those points, would be less. It would make it less in proportion to the amount of water so diverted by these various ditches. If there was an accumulative thousand acre feet by the number of ditches named, the amount that would pass below would be a thousand acre feet less, to all practical purposes, than it would be if those ditches were not in operation.

(474) If you determined the flow of a river to be 15,500 acre feet annually, and that amount of water was available and went through that river, you could increase that normal or mean flow by a hundred percent or two hundred per cent if you diverted other streams through that same channel, and the increase would be in accordance with the additional water supply.

Recross-examination.

By Mr. Shrader P. Howell:

In making my extensions, I testified on redirect examination that they cover periods on which there were only par-

tial records, and that such amounted to about five per cent. My percentages given did not include the years for which there were no records.

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(361) WILLIAM O. WILSON, a witness in behalf of complainant:

Direct examination.

By Mr. Richard J. Jackson:

I live in Cheyenne, Wyoming, where I have lived since January, 1927. My occupation or profession is attorney at law. I was Attorney General of the State of Wyoming [fol. 377] during the period of time from January 1927 to January, 1931.

(362) I recall having had conferences during that period of time subsequent to January, 1927, with officials of the State of Colorado relative to the waters of the Laramie River and trans-mountain diversions from Laramie River watershed to the Cache la Poudre watershed. By reference to my diary, I recall the first conference at which I was present was May 7th, 1929, at Cheyenne, Wyoming; May 20th, 1929, at Cheyenne, Wyoming. Referring to this one of May 7th, 1929, Mr. Hinderlider, Mr. Carpenter, Mr. Whiting, Mr. Watson, Mr. Lloyd were present at that time. Mr. Hinderlider was at that time, State Engineer of the State of Colorado; Mr. Delph E. Carpenter was at that time, water commissioner, Interstate Streams Commissioner of the State of Colorado. There were no other Colorado people present, according to my diary.

The general subject of the conference was that we took the position that Colorado was violating the terms and provisions of the decree of the United States Supreme Court in the Colorado-Wyoming case, by outlaw diversions and excess diversions. In a general way, (363) the Colorado officials took the position that they were not violating the decree.

The next conference in regard to this same subject matter, at which I was present, was on May 20th, 1929, at State Engineer Whiting's office at Cheyenne, Wyoming. According to my diary, Ralph Meeker, Mr. Harrison, deputy Attorney General of Colorado, Mr. Hinderlider, State Engineer of Colorado, John A. Whiting, State Engineer

of Wyoming, and Henry Watson, deputy State Engineer of Wyoming, and Mr. Lloyd, I think assistant State Engineer of Wyoming, Mr. Temple of Colorado, and Corlett Downey were present at that conference.

I think the general subject of that conference covered the same ground as the first conference. It lasted from two o'clock in the afternoon until three-thirty in the after- [fol. 378] noon. The attitude of the Colorado officials was the same as at the first conference on May 7th, that they were not violating the decree. As to whether they refused to take any steps to meet the demands of the Wyoming officials, I cannot recall as to that, except they took the position they were not violating the decree, and I suppose that would follow.

As to whether there was any other conference following that during the year 1929, I have not looked to see if there was a (364) record of any other conference in my diary. I do not recall any; I would not say there had been or had not been. I haven't examined to that end. It would take a long time to check through my diary and see when the next conference with Colorado officials was held with reference to this same subject matter.

Later in 1930 there was another conference. We had a conference with the Colorado officials on this same subject matter on September 26th, 1930, at Greeley, Colorado. I have no record of the representative from Colorado present. I went to Greeley, according to my diary, with State Engineer Whiting and deputy Attorney General James A. Greenwood.

The general subject matter of that conference was just the same as the subject matter of the previous conferences. The attitude of Colorado at that time with reference to this matter was still of the same position, that they had not violated the decree of the Supreme Court of the United States.

Cross-examination.

By Mr. Shrader P. Howell:

I do not recall who convened that first conference, held in Cheyenne on May 7th, 1929, or at whose suggestion it was called. We were notified by State Engineer Whiting to be there, and we were. (365) I do not remember whether

that was called at the suggestion of Mr. Hinderlider, the State Engineer of Colorado.

At that conference, there was a general discussion of the whole situation concerning the Colorado-Wyoming diver- [fol. 379] sions. Colorado took the position that in their opinion, there had not been any violations of the decree of the United States Supreme Court. I know by hearsay that Wyoming was asking for the right to inspect the measuring devices. I do not remember that Colorado, at this first conference, was willing that the measuring devices should be inspected by representatives of Wyoming. All I remember is the correspondence which was called to my attention between State Engineer Whiting and State Engineer Hinderlider. As to whether it was the general suggestion of Colorado, Mr. Whiting reported that Mr. Hinderlider would not consent to it through the correspondence.

I have no independent recollection of this meeting. I do not recall that Colorado was willing at that time to make any improvements or changes in the measuring devices that might be suggested by representatives of Wyoming, or that Colorado was willing to submit (366) the readings and the daily registration charts to the representative of Wyoming at any time. I would not say that those matters were not suggested by Colorado at that meeting.

The meeting held on May 20th, 1929, was at Cheyenne, in the office of the State Engineer. I do not recall whether or not that meeting was held at the suggestion of Colorado. I do not remember whether or not Colorado, at that meeting, offered to permit Wyoming to make any suggestions as to improved measuring devices on these streams that are involved, or that Colorado offered to submit the readings from the charts and registering devices to Wyoming representatives. I do not recall that Colorado offered to make any changes in the measuring devices that might be suggested by Wyoming.

At the meeting held in Cheyenne on May 20th, 1929, Mr. Harrison, deputy Attorney General of Colorado, was present, and Mr. Hinderlider and Mr. Temple. As to whether Mr. Delph Carpenter, the Interstate River Commissioner of Colorado, was present at that meeting (367) of May 20th, 1929, I have to rely entirely on my records, and I do [fol. 380] not find any record in my diary that he was pres-

ent, and have no independent recollection. I would not say either way.

As to whether the same general subject was discussed, as to the interpretation of the decree of the United States Supreme Court, that is all I can remember at all three of the conferences. As to whether Colorado, at that meeting, never refused to abide by the decree of the Supreme Court, that is a question of law, isn't it, Mr. Howell? As to the general attitude in the discussion being to abide by the decree about which there was some misunderstanding, it is a question of interpretation; they interpreted it one way, and we another. I would not remember whether there was no open announcement that they would willingly violate the decree of the Supreme Court, but I would not think so.

As to the other conference, held at Greeley on September 26th, 1930, I do not recall who called that conference. At each of these conferences, Mr. Whiting, State Engineer, asked us to be present, and we were present, and the conferences must have been arranged between the two state engineers.

I have no record in my diary as to who were the Colorado representatives at that conference at Greeley. I can just remember (368) generally that the subject matter was our position, that they were violating the decree, and their position, that they were not. I do not recall whether or not Colorado, at that conference, offered to make any changes in the measuring devices on these streams, or offered to submit the readings to the representatives of Wyoming.

As to when this suit—the present action—was filed, I am relying entirely on the date of notice which we served on Colorado, that we would on a certain day—that is, October 6th, 1930—ask leave to file it, and my best recollection is that it was filed on October 6th, 1930. That would be just a little over a week after the conference at Greeley on September 26th, 1930.

[fol. 381] In all of these conferences, Colorado insisted that they would abide by the decree as they saw it—as they understood it. As to whether there was any assertion that they were willingly trying to violate the decree or the terms of the decree, I hardly think those men would take that position, but I do not remember in detail.

I do not recall any further conferences prior to the filing of the suit after the Greeley conference; I am depending entirely (369) on my diary. I cannot remember as to whether the complaint had been prepared at the time of this Greeley conference.

Redirect examination.

By Mr. Richard J. Jackson:

In all of these conferences, it was Colorado's contention that the amounts of water being diverted from the Laramie River watershed to the Cache la Poudre watershed, and the means and methods of the diversion of that water, were within the terms of the Supreme Court decree. As to whether it was also their contention at these various conferences that the method of irrigation of meadow lands in Colorado in the Laramie River valley was within the terms of that decree, there was something peculiar about the Meadow Land Diversion, but I cannot recall what it was now.

Recross-examination.

By Mr. Shrader P. Howell:

As to whether Colorado's contention at all of these conferences was or was not that, under the Supreme Court decree, there were mass allocations to the state, I cannot answer it that way. All I can say is that at each of these conferences, they took the position they were not violating the decree.

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(370) Ralph I. Meeker, a witness in behalf of complainant.

Direct examination.

By Mr. James A. Greenwood:

I live in Denver, Colorado, where I have lived since 1899. At the present time, I am engaged in the business or profes- [fol. 382] sion of irrigation engineer. I have pursued the profession of civil engineering for thirty-three years.

Primarily, my work has involved water supplies investigations and studies, irrigation engineering, which involved administration of water, in connection with the State Engineer offices of Colorado and Wyoming; operation and management of irrigation districts; interstate suits; analytical studies of interstate river problems.

Coming to the more concrete details, my first work was at Twin Lakes on construction—Twin Lakes in Colorado, near Leadville, commencing in the summer of 1899. During the term of 1901 and 1902, I attended the School of Mines for about a year. I then entered the Geological Survey, Water Resources branch, and for four years, was (371) engaged on measurement of stream flow and related problems in Colorado, Wyoming, Nebraska, Utah, New Mexico, and at the termination of four years of work, was District engineer of the Denver District.

From 1907 to 1908, I was employed by the Central Colorado Power Company on hydraulic problems and stream measurement in connection with the development of water power in Colorado. During the period of 1908 to 1912, I was four years resident engineer on an irrigation project in southwestern Colorado. From 1912 to 1914, I was employed on hydrographic work on the Laramie River and its tributaries in Wyoming and Colorado by the Laramie Water Company, and prepared the water set-up and analytical studies of water supply which were presented before the original case on the Laramie River of Wyoming vs. Colorado, and testified extensively in that case.

Following that work, I went with the State of Colorado for one year on an investigational study of the use of water on the Rio Grande in Colorado, New Mexico and Texas, being special deputy State Engineer at that time. During the period of 1915 to 1917, I was the superintendent and engineer for the Terrace Irrigation District in the San Luis Valley, Colorado, which involved many administrative [fol. 383] problems, on the Alamosa and La Jara Rivers, and operation of reservoirs and canals of the Terrace District.

During 1918 and 1919, I was employed as special deputy State Engineer for the State of Wyoming, and spent one year making an investigational study and report of the present and future uses of the water supply of the North Platte River and its tributaries in Colorado, Wyoming and

Nebraska, to Kearney, Nebraska. That was a joint report with the Reclamation Service, Harold Conkling being the engineer for that organization. In 1919, I was employed by the State of Colorado on investigational work concerning the use and distribution of water on the La Plata River and tributaries of the San Juan in southwestern (372) Colorado. This study was the result of interstate controversy over the use of the waters of the La Plata River. At that time, I was made a special deputy again of the State of Colorado, and I supervised the administration and distribution of the water of the La Plata River.

I continued on that work for two years, and then took up the investigational study of the uses, present and future, of the water of the Colorado River Basin, involving seven states and extending from the headwaters in Wyoming to the Gulf of California. I continued on the Colorado River work over a period of years, and was engineer for Colorado at the conferences and negotiations of the Colorado River Compact, the La Plata River Compact, and then continued on an investigational study of the North Platte River, the Rio Grande, and some work on the Arkansas, all of which problems were interstate in character and involving present and future uses in the various states. I was also engineer for Colorado during the negotiations of the Rio Grande Compact in the winter of 1929, although I had terminated my services with Colorado after eleven years of employment to engage in private practice as a consulting engineer.

During my employment with the State of Colorado, I had an agreement whereby I was permitted to do some consulting work, and was called to the State of Idaho and [fol. 384] made investigational studies and reports on the administration of water, transmission of reservoir water, from Jackson Lake, Wyoming, to Twin Falls, Idaho. Later I was consultant to the Twin Falls Canal Company on administrative problems and the ownership of return flow.

Since being in private practice, I have made investigational studies of the reservoir possibilities of the Arkansas River and its tributaries west of the 99th Meridian in Texas, New Mexico, Kansas, Colorado, for the army engineers at Memphis, Tennessee. I (373) have spent over two years in the employ of the State of Kansas on preparation and presentation of their water set-up involving the

interstate uses of the Arkansas River in pending litigation between the States of Colorado and Kansas. I have also been consultant to the State of Wyoming on interstate river problems since 1929, with reference to the Green River, the North Platte River, the Laramie River, and the Yellowstone River, which work was concerned with interstate compact negotiations and pending litigation.

Seventeen years of my experience has been devoted exclusively to making analytical studies of interstate stream and river problems and water supply. The nature of the studies that extended over a period of seventeen years has covered every phase of work, as previously testified, from administrative problems to use and distribution of water, preparation of reports where analytical studies must be made as to past uses of water, present and future uses, not only for irrigation, but for power and equalization, and every other feature.

I am the same Mr. Meeker who testified on behalf of Wyoming in a former suit between the States of Wyoming, as complainant, and Colorado and others, as defendants, which is known as Original No. 7 in the United States Supreme Court.

(374) As to what structures and engineering equipment are necessary to measure flow of water in high altitude [fol. 385] trans-mountain ditches from the Laramie River to the Cache la Poudre River, a measuring or rating flume is the first requisite at a permanent section in the ditch. Then, following that, there should be installed an automatic recording gauge, which gives a record continuously of the depth of water passing through the rating flume.

In operating an automatic gauge, it is necessary to have a staff gauge in the stillwell, or on the side of the flume, whereby the pen record of the recording gauge can be controlled. The pen record on an automatic gauge may be set at any point on the chart and give a fictitious record unless it is controlled by an observation of the depth of water passing through the flume, and it is essential always, in setting a chart on an automatic gauge, and in removing it, that the staff gauge reading in the stillwell should be entered on the chart in order that the pen record may be checked, and, if there are variations, proper allowances made in computing the average daily gauge heights.

Having the above mentioned measuring devices in operation, the following engineering field attendance must be

given to them in order to secure dependable records of water diverted: The first step should be a measurement of water by current meter of water passing through the rating flume at various stages, and from these measurements, a rating curve is plotted, and later a rating table extracted, which gives the discharge for any gauge height of water passing through the flume. Now, these measurements should be made each year, and a rating table (375) prepared each year, in order that any changes in the ditch from various reasons may be observed and correct records obtained. If a rating table is not prepared and checked every year, erroneous records may be secured over a period of time.

A continuous record of the depth of the water in the rating flume having been secured by the automatic gauge, as shown by the pen record on the charts, the daily discharges are computed and the amount of water diverted is determined. I might state, that in setting a chart, it is neces- [fol. 386] sary to set the chart not only according to the staff gauge, but to set it according to hourly intervals which are shown on the chart.

I use the term "different stages" as synonymous with different depths of water in the rating flume.

Having secured correct gauge heights and records with the automatic gauge, and having secured necessary meter measurements of flow and prepared a correct rating table, as to what steps are necessary in addition or in the office to compute the daily flow in second feet of an irrigation ditch or trans-mountain ditch, these are the computations of the different mean gauge heights and their application to the rating table, and the extracting of the daily discharges in second feet. This work is a matter of considerable experience and requires care if accurate records are to be secured. In other words, the office work, in addition to securing the correct gauge heights, should be done by one experienced and qualified for that particular kind of work to get accurate results.

(376) Careful discharge measurements, continuous and correct gauge height records and dependable or accurate office computations are the necessary requisites for the determination of daily diversions of quantities of water from trans-mountain ditches. On the other hand, if the meter measurements are carefully made and the gauge

heights are sloppy and carelessly taken, then the results are likewise in error. In other words, there must be uniform accuracy by every agency necessarily depended upon in the measuring of a stream in order to get an accurate result, and every step of the measuring of water and recording of it.

Continuous automatic gauge heights are necessary for dependable records of trans-mountain diversions, because of the wide fluctuations which occur in stream flow at high altitude, due to changes in temperature conditions where the snow fields have melting conditions during the day, and [fol. 387] freezing conditions during the night. As a result, the stream flows very widely over a twenty-four hour period. Such changes in stream flow are classed, in irrigation parlance, as diurnal fluctuations, or daily fluctuations.

Trans-mountain streams would show the greater diurnal fluctuation at high altitudes during the summer season, because of the (377) widely different changes in temperature in the twenty-four hour period. During the winter months, temperature conditions are not constant, but they are less variable. The streams are ice-bound or snow-bound and the flow is extremely small and usually confined to the ground water, return from the soil mantle of the mountains, and there are very little changes in stream flow ordinarily. Coming to the months of April, the temperature changes become more pronounced, and the snows melt, and the stream flows respond in accordance. The maximum months of variation are the months of May and June, and then, with a decline of the melting snow fields, the variations in stream flow decline into the fall months. It is true that the period of greater or greatest diurnal fluctuation in the stream flow occurs in that season of the year when there is the greatest runoff of water in volume.

During the season of the greatest runoff, the inaccuracies would be greatest, because a small variation would make a large difference in the volume of flow. Generally, during the winter months, on a trans-mountain stream at high altitude, the diurnal fluctuation would be (378) the least and relatively small. In other words, the general condition is that the stream is fairly constant in flow.

I can cite some illustrations of diurnal variations of mountain diversions from automatic gauge height charts

on file with the State Engineer of Colorado. I will have to refer to those automatic gauge charts, which I have with me. They are official records of the State of Colorado. (Referring to charts.) Referring to the chart of the recording gauge of the Laramie-Poudre Tunnel of date June 27th, [fol. 388] 1928, I find the minimum gauge height at noon at 1.37 feet, equal to a discharge of 40 second feet, as taken from the official rating table, and the maximum gauge height during the twenty-four hour period was at eight p. m., when the gauge height was 3.10 fet, equal to a discharge of 143 second feet.

(Complainant's Exhibit No. 37 marked for identification.)

(Photostatic copy of automatic gauge chart record of trans-mountain diversion of water through the Greeley-Poudre Tunnel from the Laramie River to the Cache la Poudre River for the week of June 23rd-30th, 1928.)

Mr. Greenwood: We offer in evidence Complainant's Exhibit No. 37, which is an official and original record in the office of the State Engineer of Colorado, being an automatic gauge chart record of trans-mountain diversion of water through the Greeley-Poudre Tunnel from the Laramie River to the Cache la Poudre River, for the week of June 23rd-30th, 1928, and ask leave to substitute in the record a photostatic copy of the same.

(Complainant's Exhibit No. 38 marked for identification.)

(Photostatic copy of automatic gauge chart record of trans-mountain diversion of water through the Greeley-Poudre Tunnel from the Laramie River to the Cache la Poudre River for the week of June 12th-19th, 1932.)

Referring to the automatic gauge chart of the Laramie-Poudre Tunnel for the week of June 12th-19th, 1932, and referring specifically to the June 13th record, I find a minimum gauge heighth for the day to be, at ten o'clock a. m., with a gauge heighth of 1.80 feet, discharge 61 second feet. The maximum flow occurred at eight o'clock p. m., with a gauge heighth of 2.98 feet, and a discharge of 135 second feet. This is the same kind of a record, and it is offered for the same purpose as Complainant's Exhibit 37.

[fol. 389] It is the automatic gauge chart for the week of June 12th-19th, 1932.

(Complainant's Exhibit No. 38 offered in evidence.)
(380) (Complainant's Exhibit No. 39 marked for identification.)

(Photostatic copy of automatic gauge chart record of trans-mountain diversion of water through the Greeley-Poudre Tunnel from the Laramie River to the Cache la Poudre River for the week of June 26th-July 3rd, 1932.)

Referring to the automatic gauge heighth chart of the week of June 26th-July 3rd, 1932, of the Laramie-Cache la Poudre Tunnel, and referring specifically to June 29th, I find the minimum gauge heighth for the day to be 2.70 feet at eleven o'clock a. m., which equals a discharge of 115 second feet. The maximum gauge heighth was 3.60 feet at six o'clock p. m., discharge 180 second feet.

Mr. Greenwood: I ask to have admitted in evidence, Complainant's Exhibit No. 39, which is also an original record of the office of the State Engineer of Colorado, showing the daily fluctuations in trans-mountain diversion from the Laramie River to the Cache la Poudre River, through the Greeley-Poudre Tunnel, for the week of June 26th-July 3rd, 1932, and ask leave to substitute a photostatic copy for the original.

(381) (Complainant's Exhibit No. 40 marked for identification.)

(Photostatic copy of automatic gauge chart record of the discharge of the Sand Creek Ditch for the week of June 3rd-8th, 1924.)

Referring to the automatic gauge chart of June 3rd-8th, 1924, of the Sand Creek Ditch, and referring specifically to the date of June 4th, I find the minimum gauge heighth at 1.73 feet at six o'clock a. m., with a discharge of 50 second feet, and the maximum gauge heighth during the twenty-four hour period to be 3.05 feet at five o'clock p. m. That discharge I will leave blank for the time being, because I think there is a slight disagreement there. I will supply [fol. 390] that later from the rating table.

Mr. Greenwood: I ask to have received in evidence, Complainant's Exhibit No. 40, which is a daily gauge height

chart for the week of June 3rd-8th, 1924, showing the daily fluctuations on the discharge from Sand Creek, and as this is an original record in the office of the State Engineer of the State of Colorado, I ask leave to substitute a photostatic copy in the record for the original.

(382) The two streams from which these gauge heighth charts are taken are high mountain streams, on which there are trans-mountain diversions from the Laramie River Basin to the Cache la Poudre Basin; and with reference to Sand Creek, Exhibit No. 40 shows as to diversions from Sand Creek to a stream in the Cache la Poudre Basin—Sheep Creek.

Complainant's Exhibits 37 to 40, inclusive, are offered solely to illustrate the wide variation in discharge of high mountain streams, and show the need of continuous recording gauges in order that accurate determination of water supplies may be made. In other words, referring to Exhibit 37, the discharge fluctuates in eight hours from 40 second feet to 143 second feet, a difference of 103 second feet; and with reference to Exhibit 38, there is a fluctuation there from 61 second feet discharge to 135 second feet in ten hours on the same day. With reference to Exhibit 39, the fluctuation there is 65 second feet, (383) between the minimum and the maximum flows, in a period of seven hours. As to Exhibit No. 40, I am unable to give that at this time until I supply the correct discharge.

I have made an examination and study of all automatic gauge height records of trans-mountain ditch diversions from the Laramie River to the Cache la Poudre River on file in the office of the State Engineer at Denver, but let me limit my statement to the years subsequent to the year 1922, since records prior to that date are not available. They are not on file with the State Engineer.

[fol. 391] Referring to my notes of April 26th, 1929, made at Fort Collins at the time I called on the water commissioner of District 3, Mr. McAnnely, I went there to look over his records and discuss fully with him all records of trans-mountain diversions. Mr. McAnnely stated that the automatic charts prior to two or three years before my trip had been destroyed, that they had been burnt up. Now, I should qualify that statement slightly because, for example, on one of the trans-mountain diversions there are no records available until the year 1926, no automatic gauge charts,

and the records that were destroyed include some years subsequent to 1922, but the earliest record I found was for the year 1923. In my statement to the effect that some records have been (384) destroyed prior to 1926, I refer to the Laramie-Poudre Tunnel in that instance; and for the year 1922, the Skyline Ditch.

The origin or source of Mr. McAnnely's information as to the statement that those records were destroyed was the result of the search and examination for the records of all trans-mountain diversions for the years prior to 1923; and, I might say that that statement by Mr. McAnnely was made again on August 5th, 1930, in the presence of Deputy Attorney General Greenwood when we were there on another trip to Fort Collins on this very matter.

With relation to the Laramie River and trans-mountain diversions of water through the Skyline and Poudre Tunnel, Water District 3 in Colorado consists of the basin of the Cache la Poudre River, and is on the eastern side of the continental divide; the Laramie River and its tributaries, including Sand Creek, constitute Water District 48 in Colorado. The water diverted from the Laramie River by trans-mountain diversion to the Cache la Poudre River, by means of the Skyline Ditch and the Greeley-Poudre Tunnel diversion, is from what is known as Water District 48 in Colorado, and delivered to what is known as Water District 3 (385) in Colorado.

I have made an examination and study of the weekly com- [fol. 392] missioner's reports of Water District 3, by Mr. McAnnely, of trans-mountain diversions from the Laramie River for the period of 1925 to 1932, found on file in the State Engineer's office at Denver. I have made a search for and a study of the rating tables on file in the State Engineer's office at Denver of trans-mountain ditches diverting water from the Laramie River over a long period of years. I have made a study and comparison of the quantities of water reported weekly by the water commissioner of District 3 in Colorado, as diverted from Water District 48, and the weekly gauge heighth chart records on file with the State Engineer at Denver, Colorado.

From that study and comparison, I found that there were periods of time when the reports of the water commissioner of District 3 failed to report on all of the water being

diverted by the trans-mountain ditches, when compared with the records of the automatic gauge heighth charts. I have made a table or memorandum of that comparative study, which I have available. In connection with it, I can cite specific instances concerning unreported diverted water by the Skyline, (386) or what is sometimes known as the Laramie River Ditch during June, 1926. I prepared a comparative table showing the quantity of water during the period between June 6th to 26th, as reported by the water commissioner on his weekly reports, and as computed from the automatic gauge heighth records, and am able to state the result of my comparative study.

That record shows a discrepancy in the two records of water diverted by the Skyline Ditch. These are the official reports of the water commissioner of District 3, and the official automatic gauge charts of the Skyline Canal. Referring to the year 1926, and the weekly reports ending on June 12th, I find the water commissioner reported 136 second feet flowing for a period of five days, whereas a study and computation from the automatic gauge heighth chart by myself discloses that 142 second feet were diverted [fol. 393] for a seven day period. Likewise, in the week of June 13th-19th, the water commissioner reported 155 second feet diverted for a period of two days, and the automatic gauge heighth chart shows 99 second feet were diverted for seven days. For the week of June 20th-26th, the water commissioner reported 111 second feet diverted for four days, and the computations by Meeker from the automatic gauge heighth chart showed 111 second feet were diverted for seven days.

As to these comparative statements indicating, for instance, in the first week from June 6th to 12th, the amount reported by the water commissioner was less for a five day period than what the automatic gauge heighth chart showed in that week for a seven day period, and then in the next line, the same comparison showing the water commissioner reported a greater amount than the automatic gauge heighth chart (387) showed—that is, for two deays—than the gauge heighth chart showed for seven, the comparison of the three sets of figures indicate that more water was diverted than was reported by the water commissioner, and also, a discrepancy between the reports and what the charts record.

I have made another comparison of those same figures by converting them into acre feet. The comparison of the volume of water is more readily made by converting those records into acre foot quantities. Referring to the week of June 6th-12th, I find the water commissioner of District 3 reported 1,360 acre feet as diverted, whereas the automatic gauge heighth charts, as computed by Meeker, shows 1,988 acre feet. On June 13th-19th, the water commissioner reports 620 acre feet as diverted, whereas the records of the gauge heighth charts show 1,386 acre feet. Again, for the week of June 20th-26th, the water commissioner reports 888 acre feet, and the automatic gauge heighth charts show 1,127. Summing the two items, the water commissioner reports for the three weeks, and the Meeker gauge heighth chart reports, the total quantity diverted, and as reported by the water commissioner is 2,868 acre feet, whereas from the gauge heighth charts it shows 4,501 acre [fol. 394] feet, or unreported water to the amount of 1,633 acre feet during a three week period; meaning by "unreported water", that not reported by the water commissioner of District 3, the receiving district from the trans-mountain (388) diversion from the Laramie, but the gauge heighth chart record does not show that.

This study and the results which I have testified concerning, was arrived at by my study of the water commissioner's reports during the times stated, as compared to the report or the information taken from the automatic gauge height chart for the same period of time, and using all official records of the State Engineer, including rating tables. In other words, these results are obtained from a study of official records.

(Complainant's Exhibit No. 41 marked for identification.)
(Comparative table of Skyline Ditch diversions for June, 1926, from the Laramie River to the Poudre River.)

[fol. 395] Complainant's Exhibit 41 omitted. Printed side page 1413 post.

[fol. 396] (388) (Complainant's Exhibit No. 41 offered in evidence.)

(389) In addition to that testified to from my table, Exhibit No. 41, 15 acre feet were diverted after September 4th and also unreported during the year of 1926 by water com-

missioner McAnnely as diverted from the Laramie River to the Cache la Poudre River.

Mr. Howell: We object to that, as far as the question has gone, as hearsay.

Mr. Greenwood: I am asking the witness if he knows; you can go into his source of knowledge to find out.

Mr. Howell: His answer was, as I recall, Mr. McAnnely stated something to that effect.

Mr. Greenwood: No, as to water so unreported by commissioner McAnnely.

Yes, 15 acre feet, after September 4th. The automatic gauge height chart runs to September 9th, while the water commissioner's weekly reports end on September 4th, and I find this additional by a study of the gauge height chart which continued five days after the closing of Mr. McAnnely's reports.

I know that still additional water was diverted by the Skyline during the year 1926 from the Laramie River to the Cache la Poudre River, and not reported by water commissioner McAnnely on his weekly reports. The study of the weekly records of the water commissioner of District 3 shows that water was diverted by the Skyline Ditch through the Laramie-Poudre Tunnel from the latter part of August to the 15th of September of 1926, and delivered by the water commissioner to (390) the Larimer County Canal. I can give further detail with reference to these diversions.

During the period of August 22nd to September 25th, 1926, the Laramie-Poudre Tunnel diverted 1,466 acre feet, of which 490 acre feet was diverted as Skyline water through the Laramie-Poudre Tunnel. By that, I mean that water in the amount of 490 acre feet was carried from the Laramie River through the Greeley-Poudre Tunnel for the [fol. 397] benefit of the Skyline Canal diversion, as disclosed by a study of the weekly reports of water commissioner McAnnely of District 3, the receiving district of trans-mountain water.

The official records of the water commissioner, and weekly reports on file with the State Engineer, show that during the period of May 14th to September 4th, 1926, 17,136 acre feet was diverted by the Skyline Ditch. These reports are signed by water commissioner McAnnely. That

total of 17,136 acre feet refers to the water that was diverted through the Skyline. I have made a summary of the total quantities of water diverted by and for the Skyline Ditch during the year 1926, as evidenced by the records of the State Engineer's office. (391) I will read the summary. "

Skyline diversions from the Laramie, 1926, Item 1, as reported by the water commissioner on weekly reports to the State Engineer, period of May 14th to September 4th, 17,136 acre feet; Item 2, unreported by water commissioner for the period of June 6th to 26th, but recorded on the automatic gauge height charts, 1,633 acre feet; Item 3, unreported by the water commissioner for the period of September 4th-9th, but recorded on automatic gauge height charts, 15 acre feet; Item 4, diverted by Laramie-Poudre Tunnel for Skyline Ditch, as shown on distribution portion of weekly reports of trans-mountain diversions by the water commissioner of District 3, and delivered to the Larimer County Canal, or the Water Supply & Storage Company, 490 acre feet. Summing, we have the grand total diversion by and for the Skyline Canal during 1926 of 19,274 acre feet, with a total unreported diversion by and for the Skyline Ditch, of the Water Supply & Storage Company, of 2,138 acre feet.

I should correct that statement. I will qualify that in this way: that much water was unreported on the water shown coming into District 3 from District 48 for the Skyline Canal. However, if a study is made of another portion of the McAnnely weekly reports, we find that 490 acre [fol. 398] feet was delivered to the Larimer County Canal, and, subtracting that item from 2,138 acre feet, leaves an absolute (392) unreported quantity of 1,648 acre feet for the year 1926.

Mr. Howell: We object to the introduction of this testimony of the witness referring to the amounts of water diverted, and the amounts reported and unreported during the year 1926, for the reason that that year is not in issue in this case. It is merely alleged as to the diversions for the years 1927, 1928 and 1929. We further object upon the ground that the evidence is incompetent, irrelevant and immaterial and we move that all of this testimony referring to diversions during the year 1926 be stricken.

Mr. Greenwood: I will state, in connection with the objection of counsel, that the allegations of the bill of complaint are to the effect that because of the illegal and unlawful diversions from the Laramie River by Colorado to the Cache la Poudre River during the ten years past, or since the time of the entry of the original decree in 1922, Wyoming has been unable to obtain from the watershed of the Laramie River that amount of water which the Court decreed she was entitled to divert and use, and that the testimony here is being given by one qualified to give expert testimony and to make deductions from a study of the original records from which this data is taken.

Mr. Temple: In answer to Mr. Greenwood, the bill specifically states the elements of injury occasioned by diversions through the Skyline Canal, and limits those items to the years 1927, 1928 and 1929. No reference is made in the complaint to any illegal or unlawful diversions through and by means of those works other than for the years mentioned.

[fol. 399] As to my previous statement as to what years the (393) automatic gauge height charts showing diversions from the Skyline Ditch were on file in the Engineer's office at Denver, that was for the period of 1923 to 1932; nothing back of that. I have reviewed these charts and studied them as to the character of the records made thereby, and I valuated the chart records covering the five years of 1923 to 1927 as poor records, due to lack of staff gauge notations whereby the pen record can be verified. Without staff gauge entries as to when the chart was set and removed, there is no chance to check them. The name of the observer is usually missing, and but few of the charts are dated.

Explaining briefly what I refer to as the staff gauge entry, as previously testified, an automatic gauge record would be of no value unless it was controlled by the staff gauge reading in the measuring flume, and when the chart is set, the staff gauge is read, and it should be entered on the chart and the pen set in accordance therewith. The absence of the reading of the gauge, and its entry on the chart, casts some doubt upon the record, and at least it leaves them in an uncertain condition.

The Skyline Ditch discharges into Chambers Lake, the (394) storage reservoir on the eastern slope. All water

diverted by the Skyline Ditch discharges into Chambers Lake. If the water that is reported is less than that actually diverted, the water is still received in storage and not lost to the Skyline Ditch, whereas if the Skyline discharged directly into a channel of the Poudre River and was carried down to a ditch in the lower country, if it were unreported, it would be lost to that system and accrue to the river. The point I wish to bring out is, that this unreported water of the Skyline Ditch is not lost to that system; it goes into the bank and is held for future use.

Unreported water going through the Skyline and Chambers Lake is lost to Wyoming users on the Laramie who depend on this remainder if the diversions are in excess of the Supreme Court quantities. By that, I mean what [fol. 400] you termed the "remainder".

I have been an employe in the office of the State Engineer of Colorado. I was not directly in the employ of the State Engineer. (395) I officed with the State Engineer as a matter of convenience when I was on interstate river problems, but prior to that, in 1914, I was a special deputy State Engineer, and I am quite familiar with the records of that office and how they are kept.

(396) As to my testimony in answer to the question, "As 'unreported water', you mean that not reported by the water commissioner of District 3?" and the further question, "the receiving district from the trans-mountain diversion from the Laramie?" to which my answer was, "That is correct," that was referring to the water commissioner's record.

Q. And then, this question, "But the gauge height chart does not show that?", to which you answered, "That is true." I want to correct this question and ask you if it is not a fact that the gauge height chart does show the unreported water to which the other question referred?

That is correct, but it was not shown on the water commissioner's report. With reference to the process of diverting water that might be reported or recorded, it would be possible to divert water from one of these trans-mountain ditches, the Skyline or the Poudre Tunnel, with the same not being shown on either the water commissioner's weekly (397) report or the automatic gauge chart. If the automatic gauge is not running or recording, there would

be no record of the water diverted, and if the water commissioner did not report water which was being diverted, there would be no official record of it. In other words, the fact that one record might report it and the other might not report it would not be conclusive as to whether additional water was being diverted which was not reported by either.

I have made a study with reference to the annual runoff of the waters of the Laramie River at, for instance, the stations of Woods and Jelm and Filmore, Wyoming, over a [fol. 401] period of years, and in connection with that study, as sources from which I obtained my data, I used the published reports of the United States Geological Survey and, specifically, Water Supply Paper 469; also, the published biennial reports of the State Engineer of Wyoming.

(Complainant's Exhibit No. 42 marked for identification.)

(Water Supply Paper 469, published by the United States Geological Survey.)

Referring to Complainant's Exhibit No. 42, and particularly to Pages 206-209, pages 209-211 and pages 224-227, that is the source that I refer to as having been used in gathering the data made use of by me in determining the annual runoff at the three stations of Woods, Jelm and Filmore. I would like to state that the Jelm and Woods stations are on the Laramie River, and the Filmore station is on the Little Laramie.

(398) Mr. Greenwood: The complainant at this time offers its Exhibit No. 42 and asks that it be received as evidence in the case as to pages 206-211, inclusive, and pages 224-227, inclusive.

I also used the public records in the biennial reports of the State Engineer of Wyoming subsequent to the year 1921, which was the last year reported in Water Supply Paper 469, in the gathering of the data which I used in this study.

(Complainant's Exhibit No. 43 marked for identification.)

(Sixteenth Biennial Report of the State Engineer of Wyoming, Supplement B, for the years 1921 and 1922, title, "Stream Gauging Records".)

The records for the Laramie River near Jelm are reported on pages 116 and 117 of Complainant's Exhibit No. 43. Of the Laramie River and the Pioneer Canal near Woods, and their combined flows, are reported on pages 118-122. Of the Little Laramie River, near Filmore, they are reported on pages 128-129.

As to the source and manner in which this record is made up, as to whether the data is furnished exclusively by the [fol. 402] State Engineer of Wyoming or otherwise, the Wyoming work has been carried on in a cooperative manner between the United States Geological Survey and the (399) State of Wyoming, and this report is a continuation of the data found in Exhibit No. 42 for the year subsequent to the time of this record. The actual information or field work is carried on by the Geological Survey.

Mr. Greenwood: Complainant now offers in evidence Exhibit No. 43 and asks that it be received into the record as to Pages 116-117, 118-122, inclusive, and 128-129, inclusive.

(Complainant's Exhibit No. 44 marked for identification.)

(Seventeenth Biennial Report of the State Engineer of Wyoming, Supplement B, for the years 1923 and 1924, title, "Stream Gauging Record".)

Complainant's Exhibit No. 44, being Supplement B, "Stream Gauging Record", the seventeenth biennial report of the State Engineer for the years 1923 and 1924, is a source of information that I used in this study of the annual runoff of the Laramie River: the records for the Jelm station are found on Pages 126 and 127; for the Laramie River near Woods, at Pages 128 to 132. I point out here that the records which I have used are the combined monthly discharges for the Laramie River and the Pioneer Canal near Woods. Also, the Little Laramie River, near Filmore, is found on pages 138 and 139.

Mr. Greenwood: Complainant now offers in evidence its Exhibit No. 44 and asks that it be received in evidence in the record as to Pages 126 to 127, inclusive; 128 to 132, (400) inclusive; and 138 to 139, inclusive.

(399) (Complainant's Exhibit No. 45 marked for identification.)

(Eighteenth Biennial Report of the State Engineer of Wyoming, Supplement B, for the years 1925 and 1926, title, "Stream Gauging Record".)

[fol. 403] (400) Complainant's Exhibit No. 45, which is Supplement B, report, "Stream Gauging Record" of the eighteenth biennial report of the State Engineer of Wyoming for the years 1925 and 1926, is a source of information that I used in this study of the annual runoff of the Laramie River. The records of the Laramie River near Jelm are found on pages 76 and 77; of the Little Laramie River near Filmore, on pages 82 and 83.

Mr. Greenwood: Complainant now offers in evidence its Exhibit No. 45 and asks that it be received in the record as evidence as to pages 76 and 77, inclusive; and 82 and 83, inclusive.

(399) (Complainant's Exhibit No. 46 marked for identification.)

(Nineteenth Biennial Report of the State Engineer of Wyoming, Supplement B, for the years 1927 and 1928, title, "Stream Gauging Record".)

(400) Pages 78 and 79 of Complainant's Exhibit No. 46, which is the Supplement B, "Stream Gauging Record" of the Nineteenth Biennial Report of the State Engineer of Wyoming for the years 1927 and 1928, contain information which I consulted and used in this stream runoff study of the Laramie River near Jelm.

Mr. Greenwood: The Complainant now offers in evidence Exhibit No. 46, as to pages 78 and 79, and asks that it be received in the record as evidence in this case.

(399) (Complainant's Exhibit No. 47 marked for identification.)

(Twentieth Biennial Report of the State Engineer of Wyoming, Supplement B, for the years 1929 and 1930, title "Stream Gauging Record".)

(401) Pages 120 and 121, inclusive, of Complainant's Exhibit No. 47, being Supplement B, "Stream Gauging Record", Twentieth Biennial Report of the State Engineer of Wyoming for the years 1929 and 1930, contain information for the gauging station on the Laramie River near Jelm

[fol. 404] that was used by me in this study of the Laramie River annual runoff.

Mr. Greenwood: Complainant now offers in evidence Exhibit No. 47, as to pages 120 and 121, and we ask that it be received in the record as evidence in this case.

(399) (Complainant's Exhibit No. 48 marked for identification.)

(Twenty-first Biennial Report of the State Engineer of Wyoming, Supplement B, for the years 1931 and 1932, title, "Stream Gauging Record.")

(401) Pages 53 and 54 of Complainant's Exhibit No. 48, being the twenty-first Biennial Report of the State Engineer, Supplement B, contain information that was used by me in this study that I made of the annual runoff of the Laramie River near Jelm, and the Laramie River near Woods, and the Pioneer Canal near Woods, and the combined monthly discharge of the Laramie River and the Pioneer Canal near Woods.

Mr. Greenwood: Complainant now offers its Exhibit 48, as to pages 53 and 54, and asks that they be admitted and received in the record as evidence in this case.

As to the annual runoff of the Laramie River at Jelm, I have made a table showing the runoff by years for a twenty-three year period. The Jelm station is what is known as the state-line station, being located approxi-
(402) mately a quarter of a mile north of the Colorado-Wyoming line at the old Boswell ranch.

In this study, I have used the year 1905, and the period of 1911 to 1932, inclusive. I have, and can produce the table which I constructed, showing this runoff from the study I made. This is the table.

(Complainant's Exhibit No. 49 marked for identification.)

(Table showing the monthly and yearly discharge in acre feet of the Laramie River at Jelm, Wyoming, for the year 1905, and for the period from 1911 to 1932, inclusive.)

[fol. 405] Complainant's Exhibit No. 49 omitted. Printed side page 2560 post.

[fol. 406] (403) As to the manner in which I constructed this table, Complainant's Exhibit No. 49, and the results that it shows with reference to the mean annual runoff

over the period of years 1905, and 1911 to 1932, inclusive, the tabular quantities in acre feet for each month are shown where there are records. Where there were no records, for example, during some of the winter months when the flow is very low, the records were extended, where they were fractional, for a full month; and where the months were missing, the monthly flows were estimated from related records of other years, and in that manner, complete flows for the year were determined. The annual runoff is shown on the last column on the right of the table in acre feet, and it will be noted that the twenty-three year mean is 135,000 acre feet for the Laramie River at Jelm, the interstate station.

Explaining a little more in detail just what I mean by the foot-note in this exhibit, "fractional record extended", and how I extended the record, where there was a fractional record for a month, I referred to the table of daily discharges and, noting the month of the year, determined whether the stream was in an ascendency or decline, and compared the runoff of the month in question with the same month in other years, and arrived at a suitable figure for the runoff for the month in question.

With reference to the character "E", which is shown in my memorandum, and the foot-note stating that it is "estimated from related records", I studied the flow of the river in the months immediately preceding and following the months where there were no records (404) and compared the flows of the same months where there were records and arrived at an approximate figure for the flow of the river. I should state that the flow of the Laramie River during the five winter months of November to March, inclusive, is a matter of but ten or eleven per cent of the total flow for the year, and the inclusion of approximate quantities for the missing months would not vitiate the [fol. 407] records for the year. By that, I mean that my results are obtained from at least ninety per cent actual figures. Wherever there is an extension of a month; or an estimate for a month, those items combined do not represent over ten per cent of my total figures in finding the mean flow, a relatively small amount of the total flow for the year.

My table indicates that I have worked with an actual record with the exception of one or two instances during the

months of April, May, June, July, August, September and October, which I would call in the water year, the summer months, as opposed to the months I named, of January, February, March, November and December, as being the winter months.

(Complainant's Exhibit No. 49 offered in evidence.)

With reference to the composition of this Exhibit 49 (405) I used the method that has been accepted and standardized and in use by authorities in the compilation of data of this kind. It is a general method used by engineers in determining the total flows of a river for a year where some months are missing. The Water Resources branch of the Geological Survey uses the same method.

Mr. Howell: The defendant objects to the introduction of Complainant's Exhibit No. 49 for the reason that out of the twenty-three years' figures reported, of 1905, and 1911 to 1932, thirteen of the calculations given are purely estimates based upon mathematical calculations, and, therefore, are mere conclusions of the witness. We object to it for the further reason that the table is incompetent, irrelevant and immaterial. I would like to add that on this table, as testified to by the witness, all figures preceded by the letter "E", and are preceded by asterisks, are based upon a mere estimate, as referred to in the objection.

I have made a similar study and tabulation of the annual runoff of the Laramie River and tributaries at the point known as Woods Station near Woods, Wyoming, to deter- [fol. 408] mine the annual mean runoff over a period of years of the Laramie River at that point. This is the tabulation.

(Complainant's Exhibit No. 50 marked for identification.)
(Table showing the monthly and yearly discharges in acre feet of the Laramie River near Woods, Wyoming, for the years 1912 to 1924, inclusive, and for the year 1932.)

[fol. 409] Complainant's Exhibit No. 50 omitted. Printed side page 2501 post.

[fol. 410] (406) Complainant's Exhibit No. 50 is a table prepared by me for the purpose of ascertaining the mean annual runoff of the Laramie River at Woods, Wyoming, for the period of years 1912 to 1924, inclusive, and for the

year 1932. Monthly values are shown in acre feet, and yearly values in the right hand column, under the word "annual".

As to how I worked out this table, after compiling the records for the various months, which were published, I found there were a number of months—winter months—where there were no records. For instance, the note "A" indicates that the interpolated quantities were derived from a study of the records of the Laramie River at Jelm, Wyoming, approximately fifteen miles up stream, and, using the records at that station, I determined the appropriate values for the flow of the Laramie River at the Pioneer Dam near Woods, and thereby secured a complete record for the years in question.

With reference to the figures opposite the character "E", and the foot-note "estimated from related records", in those instances there were no records of Jelm, and I made a study of the records of other months, and of the same months in other years, and arrived at proper quantities for the months in question. Those figures opposite where appears an asterisk, with a foot-note "fractional record extended", (407) that is the same process as explained in connection with Exhibit No. 49.

Of the quantities I used during the calendar year, I have not made any determination as to what percentage of the figures appearing as representing those quantities are based upon estimate, and what percentage are based upon actual record, but it is a relatively small portion of the flow for the year. Roughly, it is a matter of ten or twelve per cent. In other words, as with reference to my compilation on Exhibit 49, it is largely based upon actual figures and actual records; and I find the annual mean runoff for a fourteen year period of 1912 to 1924, and the year 1932, to be 166,000 acre feet per year.

[fol. 411] As to there being any significance to the fact that I use the period of 1912 to 1924, inclusive, and then the additional year 1932, there was a break in the records between the year 1924 and the year 1932. I have used all the records that are published, and there was no record available for the years 1925 to 1931, inclusive.

In compiling this data and obtaining the results indicated, I used the customary procedure in engineering studies on water. (408) This method is one used quite

frequently by the Government in its studies and obtaining of data.

(Complainant's Exhibit No. 50 offered in evidence.)

Mr. Howell: The defendant objects to the introduction of Exhibit 50 for the reason that as to all items which are preceded by the letter "E" on the exhibit, and those items preceded by the letter "A", and also preceded by the asterisk, they are not based upon official records, but are mere estimates made by the witness, and therefore, constitute merely his conclusion, and, therefore, it is incompetent, irrelevant and immaterial to any issue in this case.

(Complainant's Exhibit No. 51 marked for identification.)

(Table showing monthly and yearly discharges in acre feet of the Little Laramie River near Filmore, Wyoming, for the years 1903, and 1911 to 1926, inclusive.)

[fol. 412] Complainant's Exhibit No. 51. Omitted. Printed side page 2502 post.

[fol. 413] (409) I prepared a similar table from my studies and the records I consulted, relating to the Little Laramie River annual runoff near Filmore, Wyoming, which I have here.

Complainant's Exhibit No. 51 is the table to which I referred as showing the runoff of the Little Laramie River near Filmore, Wyoming, showing the monthly values and annual values in acre feet for the year 1903, and the period 1911 to 1926, inclusive. This was obtained by the same process as used with reference to Exhibits 49 and 50, and the result shows a mean annual runoff for a seventeen year period of 87,700 acre feet. This was obtained by the same procedure and method as used with reference to Exhibits 49 and 50.

In connection with each of these exhibits, 49, 50 and 51, I indicated on the table the source of the information I used, supplemented by my own knowledge and experience as a civil engineer and the adoption of a recognized method of supplementing records that are not complete in themselves.

(Complainant's Exhibit No. 51 offered in evidence.)

Mr. Howell: The defendant objects on the same grounds as stated as to Exhibits 49 and 50, inclusive.

(410) Referring again to Complainant's Exhibit No. 42, being the records at the station near Woods Landing, I wish to correct my testimony with reference to Pages 209-211, inclusive, as those from which I took the data for my study. The Laramie River and the Pioneer Canal near Woods, which must be added to the river flow to get the total flow, the Water Supply Paper 469 contains these records on Pages 211-217, inclusive, instead of 209-211, inclusive.

Mr. Greenwood: Complainant renews its offer as to this exhibit (Complainant's Exhibit No. 42) with reference to the corrected pages 211-217, instead of 209-211.

(Complainant's Exhibit No. 52 marked for indentification.)

[fol. 414] (Comparative table of yearly runoff of the Laramie River at Jelm, Wyoming; the Laramie River near Woods, Wyoming; and the Little Laramie River near Filmore, Wyoming, for the years 1905, and 1911 to 1932, inclusive.)

[fol. 415] Complainant's Exhibit No. 52 omitted. Printed side page 2503 post.

[fol. 416] (411) I prepared the comparative table, Complainant's Exhibit No. 52. It gives the runoff values for the same years at the three stations, namely, the Laramie River at Jelm, Wyoming, the Laramie River near Woods, and the Little Laramie River near Filmore, Wyoming, for the years of 1905, and 1911 to 1932, a twenty-three year period. The annual flow at each station for each year is shown, with a mean flow for a twenty-three year period on the Laramie River at Jelm of 135,000 acre feet, on the Laramie River near Woods, 158,000 acre feet, and on the Little Laramie near Filmore, 84,000 acre feet.

With reference to the third column at the station near Woods Landing, the note "A" states that the records were determined from the Jelm-Woods curve of annual flow. The curve consisted of points plotted on cross-section paper for the years in which there were simultaneous records at the two stations. After plotting the points of flow at the two stations, a curve was thrown through the center of the points, and then the extensions were made at Woods by checking the flow at Jelm, entering the curve for the ap-

propriate values in acre feet, intersecting the curve and descending vertically to the scale at the bottom, whereby the flow at Woods was determined from the relation of flow of the various years at the two stations. In that manner, records were determined for (412) the Woods station for the years 1905, 1911, and the period of 1925 to 1931, inclusive.

Referring to the note "B", which applies to the Little Laramie River near Filmore, a similar curve was plotted for the years in which simultaneous records occurred at the two stations Jelm and Filmore, and from this curve relation the omitted items were determined and placed in the table. We then have twenty-three years' record at each station, and the long time means are on a comparable basis.

(Complainant's Exhibit No. 52 offered in evidence.)

Mr. Howell: The defendant makes the same objection to the introduction of Complainant's Exhibit 52 as to the items [fol. 417] which are preceded by the letter "A" and "B" in the table, on the same grounds as heretofore stated in the objections to the introduction of Exhibits 49, 50 and 51, inclusive.

(Complainant's Exhibit No. 53 marked for identification.)

(Comparative table of yearly runoff of the Laramie River at Jelm, Wyoming; the Laramie River near Woods, Wyoming; and the Little Laramie River near Filmore, Wyoming, for the years 1923 to 1932, inclusive.)

[fol. 418] Complainant's Exhibit No. 53 omitted. Printed side page 2504 post.

[fol. 419] (413) Complainant's Exhibit No. 53 is a comparative table of yearly runoff in acre feet of the Laramie River at Jelm, of the Laramie River near Woods, and the Little Laramie near Filmore, all in Wyoming, for the years 1923 to 1932, the most recent ten year period of records on those streams. The ten year mean for the Laramie River at Jelm is 128,000 acre feet; for the Laramie River near Woods, 150,000 acre feet; and for the Little Laramie near Filmore, 82,000 acre feet.

Those values appearing opposite the characters "A" and "B" were taken directly from Exhibit 52.

(Complainant's Exhibit No. 53 offered in evidence.)

Mr. Howell: The defendant objects to the introduction of Complainant's Exhibit 53 on the ground that the items preceded by the letters "A" and "B" are mere estimates and conclusions of the witness, and not based upon actual records, and that for that reason, are incompetent, irrelevant and immaterial.

(Complainant's Exhibit No. 54 marked for identification.)
(Table of the water supply of the Laramie River Basin for the years 1905, and 1911 to 1932, inclusive.)

[fol. 420] Complainant's Exhibit No. 54 omitted. Printed side page 2505 post.

[fol. 421] (414) Complainant's Exhibit No. 54 is a table prepared by myself to show the long-time means and the ten-year means at the stations in sequence down the river, the upper station being the Laramie River near Jelm, and the lower station being the Little Laramie near Filmore. These long-time means are over a twenty-three year period, namely 1905, and 1911 to 1932, inclusive. For Jelm, or the interstate station, the average yearly flow is 135,000 acre feet; near Woods, 158,000 acre feet; and the Little Laramie near Filmore, 84,000 acre feet.

Those are the same years that were used in my study and preparation of the tables appearing in the record as Exhibits 49, 50 and 51; this table is a summary on the data shown in those exhibits. The average yearly mean for the ten year period, 1923 to 1932, Laramie River at Jelm, Wyoming, 127,000 acre feet; Laramie River near Woods, 150,000 acre feet; and Little Laramie near Filmore, 82,000 acre feet.

(Complainant's Exhibit No. 54 offered in evidence.)

(415) Mr. Howell: The defendant objects upon the same ground and the same reasons as heretofore assigned to the introduction of Exhibits 49, 50, 51, 52 and 53.

(Complainant's Exhibit No. 55 marked for identification.)
(Comparative table of the water supply of the Laramie River Basin.)

[fol. 422] Complainant's Exhibit No. 55 omitted. Printed side page 2506 post.

[fol. 423] (416) Complainant's Exhibit No. 55 was prepared by myself, and the purpose of the exhibit is to compare the long time mean values in acre feet, as determined by Mr. Nelson, an engineer who testified in this case during the present hearing, and the long-time mean values determined by myself. For example, referring to the Laramie River at the Colorado-Wyoming line, or the Jelm station, Mr. Nelson's testimony shows for a twenty-two year period, a long-time mean at 135,560 acre feet. The Meeker determination for a twenty-three year period is 135,000 acre feet. Referring to the Laramie River near Woods, the Nelson determination was 158,240 acre feet; the Meeker determination being 158,000 acre feet. Referring to the Little Laramie River near Filmore, the Nelson determination of 82,300 acre feet; the Meeker determination of 84,000 acre feet.

Prior to the construction of this comparative table, there was no unison of study or preparation of the independent tables submitted by Mr. Nelson and myself; they were derived independently.

(Complainant's Exhibit No. 55 offered in evidence.)

Mr. Howell: The defendant objects to the introduction of Complainant's Exhibit No. 55 upon the ground that it is a mere compilation or summary of previous exhibits, which are based not upon official records, but upon estimates and computations made by the witnesses, and, therefore, are incompetent, irrelevant and immaterial and do not tend to prove any issue in the case.

(417) I have made an examination and study of the automatic gauge heighth charts, of current meter measurements, of rating tables, of weekly reports of the water commissioner of District 3, the receiving district, and of daily diversions as computed by the State Engineer's office of Colorado, of the Laramie River water diverted by the Laramie-Poudre Tunnel for the years 1931 and 1932; nothing back of that.

I found automatic gauge heighth charts of water di- [fol. 424] verted by the Laramie-Poudre Tunnel for the years 1926 to 1932, inclusive. There were no charts prior to 1926. I made two trips to Fort Collins to confer with water commissioner McAnnely with reference to gauge heighth charts of tunnel diversions prior to 1926——

Mr. Howell: We object to that as being repetition.

—and, as previously testified, Mr. McAnnely stated April 26, 1929, and on August 5th, 1930, that they had been burned up.

I made a search in the Colorado State Engineer's office in Denver to find what rating tables are on file relating to diversions (418) from the Laramie-Poudre Tunnel. The first rating table on file is dated June 1st, 1918, and applied to a concrete flume which was constructed during the summer of 1917, and during July, 1920, a rerating of this concrete flume by Mr. R. G. Hosea, deputy State Engineer.

I consulted the record in that office with reference to the rating by Mr. Hosea in July, 1920. Rating Table Book No. 43, Page 152, of the State Engineer's office of Colorado, contains that information.

Referring to Book 43, Rating Tables Canals and Ditches, being an official record in the office of the State Engineer of Colorado, on page 152 of the official rating of the Greeley-Poudre Tunnel appears the following statement by R. G. Hosea, a deputy State Engineer—this statement appears on the left hand portion of the page opposite the rating table:

"This is the worst designed rating flume I ever saw; (419) water coming from tunnel has to turn a right angle and the fall is so great that an excessive velocity is created (mean of 9.4 feet per second, at gauge 1.8, maximum nearly 12 feet). Wave action was so bad that the gauge cannot be read within 1/10th of a foot, and rock shoot through the flume and ruin meter. Water spills over wall at 1.8 gauge; bridges absolutely unsafe, and a person risks his life every time he crosses it. Water falls almost 300 feet in a quarter of a mile. No possible chance to get out if bridge fails. [fol. 425] The concrete walls seem to have been built without cement, and water comes over, under and through them. They will probably soon wash out and then a new flume can be built.—R. G. Hosea, deputy State Engineer, gauger."

I know his signature, and that is his signature. Referring again to page 152 of the official rating of the Greeley-Poudre Tunnel, I find that on June 27th, 1920, Mr. Hosea measured the discharge of 77.7 second feet. At the right of that measurement, under "remarks upon results", is the statement: "very poor." A second measurement was made on July 1st, 1920, by Mr. Hosea of 203.7 second feet, and,

under "remarks", we have the statement, "very poor; excessive velocities create waves; rock shoot through, nearly ruin meter."

Another statement on that same page——

Mr. Howell: The defendant objects to the reading of what purports to be remarks made by Mr. Hosea, for the reason that under the law, he has gone beyond what is required by the State deputy engineer, and, therefore, it is not binding upon this defendant. Furthermore, that is disconnected, and is based upon certain reports that this officer has made, and, therefore, (420) the reports, themselves, should speak for whatever they are worth.

—(continuing) "could not shut off to get low point, hence rating table is questionable; daily gauge heighth beyond .5 feet."

The flume referred to in Mr. Hosea's report as appearing on page 152 of Book 43 of the official records of the office of the State Engineer of Colorado, being the rating table of canals and ditch records from January 1st, 1918, to June 2nd, 1921, has been replaced or improved by the installation of a six-foot improved Venturi flume, wooden flume, near the lower end of the old concrete structure. According to the gauge heighth charts of the State Engineer's office, Denver, the improved Venturi flume was constructed during the period of May 18th to 22nd, 1927. As to finding any gauge heighth charts taken off of measurements from that improved Venturi flume prior to that date, the auto-[fol. 426] matic chart covering the period cited contains the statement, "new weir."

In connection with the operation of this improved six-foot Venturi flume, the State Engineer of Colorado has published a discharge table for use in the rating of improved Venturi flumes of various widths.

(Complainant's Exhibit No. 56 marked for identification.)

(Booklet of instructions for installation and tables of discharge for Improved Venturi Flume.)

(421) Complainant's Exhibit No. 56 is a table of discharges for the improved Venturi flume, from gauge heighths of 0.20 feet up to 2.50 feet, and for widths of one to eight feet, inclusive. I secured that exhibit from the

State Engineer's office in Denver, Colorado, and it is marked as having been published and released from the State Engineer's office in 1930 for use in Colorado.

Mr. Greenwood: Complainant now offers Exhibit No. 56, being the instructions published by the State Engineer of Colorado in 1930 for the installation and table of discharges for improved Venturi flume.

I have checked the discharge of the six-foot Venturi flume at the east portal of the Laramie-Poudre Tunnel for accuracy by a meter measurement, on July 11th, 1929. Referring to my original field notes of the measurement at the east portal of the Laramie-Poudre Tunnel on July 11th, 1929, I find the discharge to have been 15.35 second feet, and that was for a staff gauge reading of plus or minus 0.70 of a foot. I use the term "plus or minus" there because the wave action was so great it was difficult to read the gauge. The automatic gauge house was locked, and I was unable to refer to the stillwell gauge or the automatic charts. The gauge referred to was a staff gauge on the left side of the rating flume when looking down stream.

(422) I took a photograph of the rating flume in question at the time of making these measurements.

[fol. 427] (Complainant's Exhibit No. 57 marked for identification.)

(Photograph of the Venturi Measuring flume at the east portal of the Laramie-Poudre Tunnel taken on July 11th, 1929.)

(423) Complainant's Exhibit No. 57 is the picture taken by me on July 11th, 1929, showing the conditions obtaining at the Venturi flume at the time of the meter measurement, when 15.35 second feet were determined to be flowing through the flume by current meter measurement. The figures, words and notations on the back of this exhibit were placed there by myself.

Referring to my notes, as well as to the picture, I find that the approach channel to the flume and a considerable portion of the Venturi flume was clogged with rock debris which comes through the tunnel. As a result, approximately only one-half of the throat of the Venturi flume was functioning, due to the rock debris deposited therein. The water current was thrown largely to the right side of the flume.

There was some doubt as to whether the inlet to the stillwell was clogged.

The stillwell is shown on the left side of the wooden portion of the flume as a little house. Conditions were very unfavorable for the measurement of water, due to the rock debris, the approach of the water, and the right angle turn. The first principle in the installation of a rating flume is to install the same in a straight section of a channel or ditch, and this installation violates the first principle in that matter.

As to whether that photograph, Exhibit No. 57, indicates (424) generally the right angle location of the throat of that flume from the mouth of the tunnel, the entire structure could not be shown in this photograph at close range. I might state that at the left side of the picture, there is a right angle in the concrete wall, and that indicates the change in the channel after the water leaves the east portal of the Laramie-Poudre Tunnel—a right angle turn [fol. 428] in order to enter the Venturi flume, and within a distance of a hundred feet of the east portal of the tunnel—to the Venturi. That right angle turn is responsible for the deposition of rock debris as shown in the picture which, in turn, is the cause of the current being deflected to the right side of the Venturi.

(Complainant's Exhibit No. 57 offered in evidence.)

(425) Mr. Goyne Drummond, engineer, was with me on July 11th when I made my observations at the east portal of the Laramie-Poudre Tunnel. Mr. Drummond made current meter measurements at the Venturi flume at the east portal of the Laramie-Poudre Tunnel on that date from 2:30 to 2:45 p. m. I assisted him and we secured a discharge of 15.19 second feet. Mr. Drummond and I made a comparison of our current meter measurements taken on that date at the east portal of the Laramie-Poudre Tunnel, which shows that the two current meter measurements checked within .27 of a second foot, or within 2 per cent.

After July 11th, I examined the gauge heighth charts containing the record for July 11th, 1929, in the engineer's office in Denver, and found the pen record to be .60 of a foot, gauge height from 2:00 to 3:00 p. m. Referring to the Colorado State Engineer's table of discharge for a six-foot improved Venturi flume, a discharge of 10.63 second feet appears for the gauge heighth .60 foot.

(426) I compared the result of the measurement of Mr. Drummond and myself with the discharge in second feet registered by the recording gauge on the Venturi flume at the time the measurements were made, and found the unreported diversion to be 4.72 second feet at the time of the Meeker measurement, and 4.56 second feet at the time of the Drummond measurement. The Meeker measurement I refer to is the 15.56 second feet, and the Drummond measurement I refer to is 15.19 second feet; and the table of discharge for the flume, which appears from the gauge heighth as given, is the 10.63 second feet. From that comparison, I get an unreported diversion not shown, compared [fol. 429] with Meeker, of 4.72, and compared with Drummond, of 4.56 second feet, and converting that into a per cent, I find the measuring device as recording 30 per cent low, the unrecorded flow being 70 per cent of the actual flow.

Q. Mr. Drummond testified that he measured the water diverted by the Laramie-Poudre Tunnel in the Venturi flume at the east portal on July 17th, 1929, for a gauge height of 2 feet, with a meter discharge of 91 second feet; compare that discharge with the Venturi table of discharge with a gauge height of 2 feet, and state what the difference amounted to in the measuring device?

Referring to the tables of discharge for the improved Venturi flume, six-foot width, and for a gauge heighth of 2.00 feet, I find the discharge should be 72.50 second feet. Subtracting this quantity from the meter discharge of 91 second feet secured by Mr. (427) Drummond, shows the measuring devices to be low or unrecording by 18.5 second feet, and converting this figure into a per cent, the measuring devices are registered 20 per cent low. I mean by "measuring low", that 20 per cent more water was passing through than was being accounted for on the measuring device. The comparison just made is the percentage of discrepancy in the automatic Venturi flume when compared with the current meter measurement.

As to what physical conditions prevailed at the Venturi flume at the east portal of the Laramie-Poudre Tunnel at the time of these check measurements, referring to my orig-

inal notes, I find that the upper part of the flume was clogged with rock debris from the tunnel; also, the approach channel. Approximately one-half of the flume cross-section at the Venturi throat was obstructed with debris and only the right half was clear, as will be shown by reference to the photograph heretofore entered as Complainant's Exhibit No. 57.

As to what the channel conditions were at the time between the Venturi flume and the east portal of the Laramie- [fol. 430] Poudre Tunnel, the distance from the east portal of the tunnel to the Venturi flume was approximately a hundred feet; about half way from the east portal to the Venturi flume, there is a right angle turn in the channel. There is also a drop of about five feet between the east portal and the (428) Venturi flume. Rock debris from the tunnel was deposited in various parts of the channel leading to the Venturi, and especially on the inside of the curve.

The right angle turn is a very adverse feature, throwing the major portion of the water along the right or outer side of the flume and destroying any uniform distribution of velocity within the flume. Due to the continued deposition of rock in the approach channel the grade in the approach channel is continually changing, and this, in turn, affects the velocities and the distribution of the water through the flume and its accuracy.

I made a measurement of the water being diverted through the Laramie-Poudre Tunnel at the west portal on July 11th, 1929. At 8:10 a. m., both Mr. Drummond and myself made current meter measurements of the water being diverted in the inlet canal of the Laramie-Poudre Tunnel. My measurement showed 15.54 second feet entering the tunnel; Mr. Drummond's measurement disclosed 15.19 second feet. I was in error in my statement as to the 15.54 second feet being my measurement—that is Mr. Drummond's measurement. The Meeker measurement was 15.82 second feet.

I did not find any material increase or decrease in the flow on July 11th as measured at the east portal, compared with the measurement at the west portal, of the tunnel. The difference between (429) the flow at the east and west portals was a matter of .35 of a second foot by Meeker, and .47 second feet by Drummond.

I made a study of the charts from the automatic gauge of the Venturi flume on the Laramie-Poudre Tunnel for the [fol. 431] month of July, 1929. As to what I observed from this study, referring to the original record for the week of July 13th, 1929, of the Laramie-Poudre Tunnel, the east portal at the Venturi flume, I find that the chart was set on July 13th with a pen record 0.10 feet in error—that is, it was recording too high by one-tenth of a foot. The staff gauge notation was 1.00, while the pen was set at 1.1 feet.

Again referring to the record on July 17th, I find that the mean daily gauge heighth noted on the chart was 1.24 feet, equal to a discharge of 33.82 second feet, as taken from the Venturi table. I computed the mean daily gauge heighth from the pen record for July 17th, and find it to be 1.54 feet, equal to 47.79 second feet by the Venturi table, the difference being 13.97 second feet, or 28 acre feet of unrecorded water for July 17th, 1929. As to my statement of the staff gauge notation being 1.00—I mean, feet—while the pen was at 1.1.

(430) The officials of the State Engineer's office of Colorado have made a check by current meter measurements at the Venturi flume at the east portal of the Laramie-Poudre Tunnel. I have examined and studied all current meter measurements made by these Colorado officials on file in the State Engineer's office, Denver, covering the period of 1927 to 1932. I have photostatic copies of the field notes of these current meter measurements, which are photostatic copies of the original field notes taken from the office of the State Engineer of Colorado and as furnished me by the State Engineer's office.

When taken in connection with the chart record of the automatic gauge and the Venturi discharge tables issued by the State Engineer of Colorado, these current meter measurements show extreme inaccuracies, both plus and minus quantities.

These are the photostatic copies I refer to.

(Complainant's Exhibit No. 58 marked for identification.)

[fol. 432] (Photostatic copy of the automatic gauge chart record of the Venturi flume at the east portal of the Laramie-Poudre Tunnel for the week of July 13th-20th, 1929.)

(431) Mr. Greenwood: Complainant now offers in evidence Complainant's Exhibit No. 58, being the automatic gauge chart for the week of July 13th-20th, 1929, from the automatic gauge chart of the Venturi flume at the east portal of the tunnel, and asks leave to substitute in the record a photostatic copy of the same.

(432) Complainant's Exhibit No. 58 is the official record I referred to a moment ago in connection with my testimony as to the gauge heighth chart for the week of July 13th-20th, in the year 1929.

(431) (Complainant's Exhibit No. 59 marked for identification.)

(Ten photostatic sheets, being copies of the original field notes taken from the official records of the office of the State Engineer of Colorado.)

(432) I have examined and studied the current meter measurements made by the Colorado officials as indicated on Exhibit No. 59. As to what my study disclosed with reference to those records, referring to Complainant's Exhibit No. 59, and specifically to the measurement of August 3rd, 1929, gauge heighth 0.54, no name is entered in the field notes as to who made this measurement, but I find on referring to a table which I have prepared from the original field notes of the State Engineer's office, that it was made by Mr. J. H. Bailey. Turning to the table on mean velocities in the notes, I find that the left side of the flume velocity is approximately double the velocity at the other side of the flume. I cannot state that that is the left side, but I will state that on one side the velocity is twice the velocity on the other side.

Referring to the measurement of May 20th, 1930, no staff gauge heighth is entered in the proper place on the [fol. 433] record and measurements made by Bailey. I find that the velocity on one side of the flume is .50 of a foot, and on the other side, 1.53 feet, or three times as great as on the other side.

(433) Referring to a measurement on July, 1932, no date given, gauge heighth 1.11, by M. C. Hinderlider, notes by R. L. Parshall, I find that the velocity on one side of the flume is .70 of a foot, and on the other side 4.22 feet, or six times as great on one side as on the other side. I also find on this measurement a note "17 per cent long", and

from a study of the data thereon, in comparison with the Venturi tables, I find a discharge for a gauge heighth of 1.11, as taken from the Venturi tables for a six-foot Venturi, should be 28.35 second feet, whereas the meter discharge by Messrs. Hinderlider and Parshall was 34.68 feet, and that is the origin of the note "17 per cent long".

I find, on referring to the measurement of July 15th, 1932, a gauge heighth of 1.54, with a question mark, and a lower note stating that the gauge heighth was taken from the chart, approximately 1.54, by Whitten; that the velocities on one side of the flume are ten times as great as they are on the other; namely, on one side .20 of a foot, and on the other side 2.38 feet.

These citations show that there is some disturbance in the measuring devices, for the principle on which it is designed assumes a uniform approach, or fairly uniform approach of water before its entry into the flume. My reference to the Venturi table of discharge schedules was to Exhibit No. 56 in this record.

Mr. Greenwood: Complainant now offers in evidence its Exhibit 59, composed of ten sheets of photostatic copies of the original field notes taken from the official records of the office of the State Engineer of Colorado, and asks that they be received as evidence in this case.

(Complainant's Exhibit No. 60 marked for identification.)

[fol. 434] (Comparative table of check current meter measurements by State Engineer's office of Colorado and recorded flows of the Improved Venturi Flume at the east portal of the Laramie-Poudre Tunnel.)

[fol. 435] Complainant's Exhibit No. 60 omitted. Printed side page 2531 post.

[fol. 436] (434) I have made a table of measurements showing the errors as found in these records with reference to which I have just testified, comparing the current meter discharges with the recorded quantities of water passing through the flume. Complainant's Exhibit No. 60 is the table prepared by me. It shows the comparisons and the percentage of error I ascertained from the study and examination.

Referring to this Exhibit 60, the first column gives the year of the measurement; the second column, the month and day; the third column, the names of the hydrographers; the fourth column, the chart gauge heighth—that is, as taken from the official records of the Venturi; the fifth column, the meter discharge in second feet; the sixth column, the discharges in second feet as taken from the Venturi tables, Complainant's Exhibit No. 56; the seventh column gives the difference in second feet between the meter discharge and the Venturi table discharge, with a plus or minus sign in front to indicate whether above or below the current meter measurement; the eighth and last column gives the per cent of error, with the current meter measurements taken as a base record. These errors have plus and minus signs.

The above table has been prepared to show the disagreement in diversion quantities from the Laramie River, as measured by current meters and as registered by the automatic gauge charts using Venturi tables to determine the discharge. The Venturi records are at (435) wide variance with the current meter discharges, due to conditions obtaining at the flume.

Referring specifically again to column 8, we find that the first measurement shows a plus error of 32 per cent; the second measurement, a plus of 29 per cent error; the third measurement, a plus of 56 per cent error; the fourth measurement, a minus 5.6 per cent error; the fifth, minus 9.6 per cent error; the sixth, minus 8.2 per cent error; the seventh, minus 10 per cent error; the eighth, minus 4.4 per cent error; the ninth, minus 18 per cent error. The tenth [fol. 437] was substantially in accord, the error was negligible; the eleventh, minus 11.5 per cent error; the twelfth, plus 8.3 per cent error; the thirteenth, plus 5.8 per cent error; and the fourteenth, plus 14.8 per cent error.

These percentages in column 8, to which I have just testified, indicate the difference between a measurement obtained by the current meter measurement and the Venturi table measurement, and the table also shows the difference in second feet, as well as the percentage, and the comparative measurements from which the percentage and differential in second feet are determined, where it was made with the same gauge charts—complete data on the table

showing derivation of the difference and the per cents, and how they are determined.

(Complainant's Exhibit No. 60 offered in evidence.)

I have examined and compared the reports of the water (436) commissioner of District 3 of the diversions of water from the Laramie River by the Laramie-Poudre Tunnel for the year 1926 with the automatic gauge heighth charts for all records on file in the State Engineer's office in Denver. By a comparison of these records, I found that charts are on file from May 1st to September 23rd, but no water was reported by the water commissioner of District 3 prior to May 5th, 1926.

I have computed from the chart records the quantity of water diverted but unreported for the period from May 1st to May 4th, inclusive, of 1926, and can give the results of my study and comparison if I may be permitted to refer to the original record, which is the chart of May 5th, 1926.

I am referring to the automatic gauge heighth chart of the Laramie-Poudre Tunnel, east portal, for the period of May 1st to 8th, 1926. I find that the average daily gauge heighths, as taken from the chart, are—May 1st, 0.90 feet; May 2nd, 0.94 feet; May 3rd, 1.02 feet; May 4th, 1.15; and that the corresponding discharges, taken from the proper [fol. 438] rating table on file in the State Engineer's office, give the following discharges for the days in question —May 1st, 39 second feet for 8 hours, equals 26 acre feet; May 2nd, 42 second feet, equals 84 acre feet; May 3rd, 48 second feet, equals 96 acre feet; May 4th, 60 second feet, equals 120 acre feet; or a total quantity in acre feet of 326 unreported by the water commissioner (437) of District 3, but which is recorded on the automatic gauge height chart.

I have examined this water commissioner's report for this period of time. We have the original records in the room.

(Complainant's Exhibit No. 61 marked for identification.)

(Photostatic copy of the daily gauge heighth chart of the Laramie-Poudre Tunnel automatic gauge for the week of May 1st-8th, 1926, being an official record of the office of the State Engineer of Colorado.)

(438) I have the water commissioner's weekly report for the week ending Saturday, May 8th, 1926. It was from the study of that report and the gauge heighth chart concerning which I have just testified that I determined this amount of water, 326 acre feet, not being shown on the water commissioner's weekly report. The report states that for four days ending on May 8th, the average daily amount of water diverted was 59 second feet from the Laramie River by the Greeley-Poudre Tunnel.

Mr. Greenwood: Complainant now offers its Exhibit No. 61, being the official record of the office of the State Engineer of Colorado, daily gauge heighth chart of the Laramie-Poudre Tunnel automatic gauge for the week of May 1st-8th, 1926, and asks leave to substitute in the record a photostatic copy of this original.

(Complainant's Exhibit No. 62 marked for identification.)

[fol. 439] (Photostatic copy of the original field notes of the water commissioner for the week of May 1st to 8th, 1926, an official record of the office of the State Engineer of Colorado.)

(439) Complainant's Exhibit No. 62 is the record from which I made the comparison with the gauge height chart for the same period of time, as shown on Exhibit No. 61. This gauge heighth chart of the automatic gauge shows the discharge for a full week, and this one for a fraction of a week, four days. That is the basis for my statement that during that week, 326 acre feet were discharged through the tunnel but not reported on the water commissioner's weekly report.

(Complainant's Exhibit No. 62 offered in evidence.)

In my examination and comparison of the records of the State Engineer's office relating to water diverted by the Laramie-Poudre Tunnel, I found diversions unreported by the water commissioner of District 3 where chart records or other information were available, for the year 1931. The water commissioner's weekly reports end on August 26th, whereas the automatic gauge heighth charts show diversions continued until August 31st. I wish to correct that statement by saying that the automatic gauge heighth charts show diversions continued until August 27th, (440)

instead of the 26th, a difference of one day. The water commissioner's weekly report discontinued on August 26th, and the gauge heighth on the 27th, a difference of one day.

As to whether it would be possible to continue diversions of water, either in the early or late season, that would not have to be reported on either the water commissioner's weekly report or the automatic gauge heighth chart, such a condition could very easily obtain. In other words, the fact that the official records of both the automatic gauge heighth charts and the water commissioner's weekly reports would indicate diversions ceased on a certain day, would not prevent water from continuing to be diverted after that [fol. 440] time, and seldom is a note found on any of the charts stating that——

Mr. Howell: We object to that; that is pure speculation. You were asked about what the possibilities might be in the future. We move to strike the answer.

—this is the end of a run of water, or the commencement of a run, so that without such note there is uncertainty.

From my knowledge of the method and practice of diversions of trans-mountain ditches from the Laramie River to the Cache la Poudre River, it is a common practice to commence diversions before the record of such diversion is instituted, and to continue those diversions after (441) the record is terminated in the fall. An examination of the records of the water commissioner, in comparison with the automatic gauge heighth charts, show that generally there is unreported diversions for a few days prior to and subsequent to the weekly reports of the water commissioner of District 3.

My judgment, as a civil engineer, as to the accuracy of the measuring devices of the Laramie-Poudre Tunnel which are installed at the east portal, is that the records appear to be generally in error and, frequently, grossly in error, since the six-foot improved Venturi flume has been in service, a matter of about six years, and current meter check measurements over that period indicate such errors. While the improved Venturi flume is an excellent measuring device, the conditions under which it has been installed and operated are such as to destroy its accuracy in recording diversions of water from the Laramie River.

I am familiar with the location of the Divide Ditch, which is sometimes referred to as the Sand Creek Ditch. I made

a field examination of the head works on Sand Creek and the physical conditions of this Sand Creek or Divide Ditch in June, 1929. The length of that ditch is approximately one mile; it is used for the purpose of connecting Sand [fol. 441] Creek with Sheep Creek, a tributary of the Cache la Poudre River.

(442) The head works of the Divide Ditch consist of a very substantial diversion dam, with head works composed of a masonry structure and steel Tainter gates capable of diverting the entire flow of Sand Creek. The purpose of these headgates and ditch is to convey water from the channel of Sand Creek into Sheep Creek drainage, a tributary of the Cache la Poudre. The ditch is located in Colorado—Sand Creek is an interstate stream, rising in Colorado and entering the Laramie River in Wyoming. The Divide Ditch is a trans-mountain ditch between the Laramie and Poudre watersheds. The elevation of the Sand Creek Ditch is about nine thousand feet above sea level.

I have examined in the field, and studied in the office of the State Engineer of Colorado, the records of the diversions of water diverted from Sand Creek by the Divide Ditch, the field measurements being made in June 1929; and I also made a thorough search of all the records of the Divide Ditch on file in the State Engineer's office in Denver.

I found the Divide Ditch to be equipped with a rating flume and an automatic gauge. I also found that shifting channel conditions prevailed in the rating flume, there being a heavy deposit of (443) gravel and decomposed granite. The conditions were adverse to accuratae measurement of water, and current meter measurements should be made each year and a rating table prepared for that reason, in order that the correct volume of water be recorded as diverted.

As to what quantity of water was being diverted from Sand Creek to Sheep Creek by the Divide Ditch at the time of my visit on July 12th, 1929, referring to my original meter notes, I find that at nine o'clock a.m., 8.6 second feet of water were being diverted from Sand Creek, with a gauge heighth of 0.69 in the concrete rating flume.

In my examination of the records on file in the office of the State Engineer of Colorado, I did not find a rating table on file pertaining to measurements from Sand Creek for [fol. 442] each year. I did find one for the year 1912. I did

not find a rating table for any other year in the State Engineer's office at Denver; that is the only one, and it was twenty years old. As to whether I have a copy of this rating table of 1912, or the original available, I would like to refer to the original records which Mr. Hinderlider has—rating table, Book No. 40, page 69.

(444) Referring to Book No. 40, being the Rating Tables of Canals and Ditches, of August 1911 to October 1913, the official record from the office of the State Engineer of the State of Colorado, and particularly to page 69 of the date of June 15th, 1912, I find there a rating table of the Wilson Supply or Sand Creek Ditch, in Water District 48, which was prepared by Thomas Greve, Jr., hydrographer, of date June 15th, 1912. Page 69 also contains a table of eleven measurements by O. F. Shattuck of water measured in the Sand Creek flume. From these measurements, the table has been prepared. The table starts with the gauge heighth of .15 feet, zero discharge, and ends at gauge heighth 2.4 feet, and 144 second feet discharge. I note at the bottom of the table that the field notes of these measurements was furnished by O. F. Shattuck, Greeley, Colorado. On the opposite side of the page, where a form is prepared for the rating flume description, no data have been entered.

In connection with the recital on page 69, containing blanks for the entry of data and information pertaining to the official rating of a stream, it is necessary or customary to fill in the information that is provided for there for the reason that new rating flumes are frequently installed in a ditch where the conditions have changed, and the form is to bring into permanent record, such conditions. This rating table refers to an official rating of the Wilson Supply or Sand Creek Ditch, which is the ditch I have testified to as being constructed between a point on Sand Creek and where it goes over the divide and connects with Sheep Creek.

[fol. 443] (445) I was unable to find any other rating table on file in the office of the State Engineer of Colorado pertaining to the rating of water discharged from Sand Creek. You could not accurately determine, by using a 1912 rating table, the amount of water being diverted by the Divide Ditch from Sand Creek in 1929 for two reasons. During the period of twenty years, there would be con-

siderable changes in a ditch, and a table twenty years old would be obsolete and its use would lead to erroneous values. The second and further reason is that the rating flume now used in Sand Creek or Divide Ditch is a different rating flume than the one which was used in rating the Sand Creek Ditch in 1912.

In my judgment, the fact that there was not on file in the State Engineer's office a rating table more recent than 1912 for measuring water diverted from Sand Creek by the Divide Ditch, indicates a lack of supervision or the lack of keeping of reliable records with reference to these diversions by water officials of the State of Colorado.

Mr. Howell: We object to that; the witness has testified to the facts, and you are asking him for a conclusion. It is purely a matter from which the Court can draw its own conclusion. I do not know of any other instances where the diversion works and a ditch have been in operation for a period of twenty years, which is being rated by a table twenty years old.

Tables of daily discharge of Sand Creek, or the Divide (446) Ditch were prepared by the State Engineer's office of Colorado for the years 1931 and 1932, and I found that a twenty year old rating table was used in computing the daily discharge values shown therein. As to whether I have in my possession the official records showing the tables prepared or daily discharges for 1931 and 1932, I would like to obtain the originals from Mr. Hinderlider.

(Complainant's Exhibit No. 63 marked for identification.)

(Photostatic copy of the rating table for the Wilson Sup-
[fol. 444] ply or Sand Creek Ditch of date June 15th, 1912, prepared by Thomas Greve, Jr., hydrographer, an official record of the office of the State Engineer of Colorado.)

(447) As to whether the figures found there and used in making the rating table, Complainant's Exhibit No. 63, are the same as appear on Page 69 of the August 1911-October 1913 official rating tables of canals and ditches of Colorado, I find on comparison that the rating table agrees from the gauge heighth of .20 discharge, 0.5 second feet, to gauge height 2.4, 144 second feet. In addition, the table has been extended for gauge heights of 2.5, 2.6 and 2.7. It is

the same rating table found on page 69 from gauge heighth 0.20 to gauge heighth 2.40, which table was prepared in June, 1912.

(Complainant's Exhibit No. 64 marked for identification.)

(Photostatic copy of the table of daily gauge heights in feet, and discharges in second feet of the Sand Creek Ditch at the rating flume for the year ending September 30th, 1931, as prepared by the State Engineer's office of Colorado.)

(448) Complainant's Exhibit No. 64 is a table of daily gauge heights in feet and discharges in second feet of the Sand Creek water at the rating flume for the year 1931, as prepared by the State Engineer's office of Colorado. This is an original computation of the State Engineer's office of automatic gauge heighth charts on file there. The daily mean gauge heights have been extracted from the automatic charts and entered in a proper column, and then these gauge heights have been applied to the 1912 rating table, Complainant's Exhibit 63, and daily discharges entered in the proper column for the months of May and June, the diversion period of that ditch.

(Complainant's Exhibit No. 65 marked for identification.)

(Photostatic copy of the table of daily gauge heights in feet, and discharges in second feet, of the Sand Creek Ditch at the rating flume for the year ending September 30th, 1932, as prepared by the State Engineer's office of Colorado.)

[fol. 445] (449) Complainant's Exhibit No. 65 is a table of daily gauge heights in feet, and discharges in second feet, of the Sand Creek Ditch at the rating flume for the year 1932. Mean daily gauge heights have been extracted from the automatic gauge heighth charts on file in the State Engineer's office. These gauge heights have been applied to the rating table and discharge quantities entered for the proper days and months, and the table constitutes the computed record of the State Engineer's office.

Mr. Greenwood: The complainant now offers its Exhibit 63, and asks that it be received as evidence in the record,

and requests leave to substitute a photostatic copy in the record, and to withdraw the original exhibit.

Complainant offers its Exhibits 64 and 65, being the daily discharge records of water discharged from Sand Creek through Divide Ditch, No. 64 referring to 1931, No. 65 referring to 1932, and asks that they be received in the record as evidence and permission granted to substitute, in lieu of the originals, photostatic copies thereof.

As to whether I have attempted to determine if accurate measurements could be obtained or could be made in 1929, 1930 or 1931 of diversions from Sand Creek by the Divide Ditch by the use of the 1912 rating table, referring to the meter measurement of July 12th, 1929, made by me, and to which I have previously testified, I found a discharge of 8.6 second feet, and a gauge heighth of 0.69 feet. Referring to the 1912 rating table of the Sand Creek or Divide Ditch, Exhibit 63, I find a discharge for 0.69 feet to be 10.2 second feet, which shows an error of 1.6 second feet, or plus 19 per cent error.

(450) With reference to the testimony of Goyne Drummond in this case, as to measurement by him of June 21st, 1932, from Sand Creek, wherein he stated that he determined a discharge of 43.76 second feet by a gauge heighth of 1.55 feet, I have checked this measurement against this 1912 rating table and find that for a gauge heighth of 1.55 [fol. 446] feet, the rating table gives a discharge of 58.2 second feet, a difference of 14.4 second feet more than the current meter measurement, and this is a plus error of 33 per cent.

I know that a rating table had been prepared or been made by Colorado officials more recent than the 1912 table that I have testified concerning. At my conference of April, 1929, with water commissioner McAnnely at Fort Collins, Mr. McAnnely stated that he rated the Sand Creek Ditch in 1922 and since that time, has used a rating table which is now ten years old. I made a copy of the McAnnely rating table on April 26th, 1929, in the office of the water commissioner at Fort Collins.

As to whether, in my estimation, the rating table of 1922 made by Mr. McAnnely applicable under conditions now obtaining at the Sand Creek rating flume for accurate measurements of water diverted from Sand Creek through the Divide Ditch, I consider the use of such a table, ten years

old, to be of very doubtful value in computing and determining the water diverted under shifting channel conditions which now obtain, for the reason that with high stages of flow in a ditch, a blanket of gravel and sand is cut out and under declining ditch flows, new deposits are formed in the rating flume with changed flow conditions.

(451) The use of this ten year old rating table does not indicate to me careful and adequate supervision of discharge measurements for trans-mountain ditches. To insure accurate measurements of trans-mountain diversions, in my judgment, a rating table should be made every year under the conditions obtaining in the Sand Creek Ditch, and generally in other trans-mountain ditches, every year; but especially in the Sand Creek Ditch, on account of the shifting channel conditions. It might be found that it would require two or three ratings during the year to accurately record the water diverted by that ditch. Under the conditions obtaining at the rating flume, accurate and dependable [fol. 447] records of water diverted from Sand Creek by the Divide Ditch cannot be obtained without frequent current meter measurements and frequent rating tables. As to how I evaluate the tables of the daily discharges prepared by the State Engineer's office of Denver of water diverted by Sand Creek Ditch for the years 1931 and 1932, I class such records to be grossly in error and wholly valueless, and showing erroneous quantities of water diverted from Sand Creek to Sheep Creek. These records are unreliable, and their use would lead to false conclusions.

In addition to the records found in the State Engineer's office, showing diversions of water from Sand Creek for the years 1931 and 1932, I found for those same years, the weekly reports of the water commissioner of District 3, showing a much lesser amount of water diverted (452) from Sand Creek by the Divide Ditch for the years 1931 and 1932. I compared the McAnnely weekly reports with the reports in the office of the State Engineer of Colorado, and referring to the year 1931, I find the weekly reports of the water commissioner show that 2,150 acre feet were diverted from Sand Creek by the Divide Ditch. Referring to Exhibit 64, daily diversions from Sand Creek Ditch, prepared by the State Engineer's office, 3,020 acre feet were diverted—a difference of 870 acre feet between the two records, the State Engineer's office reporting 870 acre feet more than is shown on the weekly reports of the water commissioner.

These are both official records of the State of Colorado from which I made the comparison. Referring to the year 1932, the weekly reports of the water commissioner show that 5,134 acre feet of water were diverted by the Divide Ditch from Sand Creek. Further referring to Exhibit 65, daily diversions of Sand Creek Ditch, as prepared by the State Engineer's office of Colorado, 7,652 acre feet were diverted by the Divide Ditch or Sand Creek Ditch from Sand Creek. The difference between the two records is 2,518 acre feet. These are, also, both official records of the State of Colorado for 1932.

[fol. 448] I find the records used by Water Commissioner McAnnely of District 3 and the State officials of Colorado to be in practical accord for approximately the same period. (475) At the time of my visit to the Divide or Eaton Ditch, I took some photographs or pictures disclosing the constructed ditch, or portions of it, including the headgate and the diversion works. I am familiar with the character of the chart records filed in the State Engineer's office at Denver regarding the discharged water from Sand Creek Ditch; I have examined and studied the charts and other records on file for the period of 1923 to 1932, inclusive.

I observed that these chart records had been very carelessly kept. I have available such original records. Referring to (476) these records, I will state in what manner they have been kept and made with reference to the diversions from Sand Creek.

Referring to the year 1923, automatic gauge heighth charts of the Sand Creek Ditch, I find there is but one entry of gauge heights of the staff gauge at the time the nine charts were set or removed from the automatic gauge. Without the staff gauge control there is no way of verifying the pen record. I find further that there are two charts on which no dates have been entered, as provided in the form, on the chart. For these reasons, the records are of little value.

These nine charts cover the period of time from May 19th to some date in July, 1923, presumably the 7th. Included in those nine charts that I refer to, are two that are not dated. As to my statement that some of them contain but one entry—referring to them once more, if the gauge heighth chart record is properly kept and shown, there should be two entries on each chart, one at the time of set-

ting the chart and one at the time of removal—the form so provides. On the chart of June 28th-July 2nd, appears at the time of setting the chart, "staff gauge heighth 14"; I presume that should be 1.4, but the pen record at the time the chart was set disagrees with that gauge heighth, being 1.04.

(Complainant's Exhibit No. 66 marked for identification.)

[fol. 449] (Photostatic copies of nine official gauge heighth charts on file in the office of the State Engineer of Colorado taken from the automatic register operated on the Divide or Sand Creek Ditch covering the period of time from May 19th to July 7th, 1923.)

(477) Mr. Greenwood: Complainant now offers its Exhibit 66, consisting of nine official gauge heighth charts, as official records in the office of the State Engineer of Colorado, showing the manner in which these charts have been placed upon and removed from the automatic register operated on the Divide or Sand Creek Ditch, for the purpose of recording the water diverted through the Divide Ditch from Sand Creek to Sheep Creek, and we ask leave to substitute, in lieu of these original records, photostatic copies of the same.

These charts which are offered in the record as Complainant's Exhibit 66, are the ones from which I just testified with reference to how the charts have been kept on Sand Creek during the period of time from May 19th to July 7th, 1923.

Referring now to the automatic gauge heighth charts for the Sand Creek Ditch for the year 1924, I find but two charts for that season's diversion of water, commencing on May 21st and ending on June 3rd. At the time of setting of the first chart on May 21st, the gauge heighth of the staff was indicated at 2.75, whereas the pen record indicates the chart was set for a gauge heighth of 1.80 feet—no staff gauge notation is entered when the chart was removed.

Referring to the chart of May 27th, I find the staff gauge entry to be 1.1 feet when the chart was set. Referring to the pen record I find it is set at 1.60 feet, there being a wide disagreement on both charts as to the pen reading and the staff gauge entries. This casts serious doubt upon the records.

[fol. 450] As to whether I endeavored to learn if there were other charts for that year, 1924, I have just searched through the files which (478) Mr. Hinderlider has here, and that is all I found in that particular year.

(Complainant's Exhibit No. 67 marked for identification.)

(Photostatic copies of two official gauge heighth charts on file in the office of the State Engineer of Colorado taken from the automatic register operated on the Divide or Sand Creek Ditch covering the period of time from May 21st to June 3rd, 1924.)

(479) Complainant's Exhibit 67, consisting of two official gauge heighth charts for the year 1924 regarding water diverted by Sand Creek Ditch from Sand Creek into Sheep Creek, are the charts concerning which I have testified for that year.

Mr. Greenwood: Complainant now offers in evidence its Exhibit No. 67, consisting of two official gauge heighth charts, official records in the office of the State Engineer of Colorado, and asks that they be received in evidence, with permission to withdraw the originals and substitute in lieu thereof, photostatic copies for the record.

(Complainant's Exhibit No. 68 marked for identification.)

(Photostatic copies of seven official gauge heighth charts on file in the office of the State Engineer of Colorado taken from the automatic register operated on the Divide or Sand Creek Ditch covering the period of time from May 6th to June 21st, 1925.)

(480) As to what Complainant's Exhibit No. 68, consisting of official gauge heighth chart records kept as official records in the office of the State Engineer of Colorado pertaining to diversions of water from Sand Creek by the Divide Ditch during the year 1925, indicate as to how the record of discharge of water from Sand Creek has been kept during that time, the charts cover the period of May 6th to June 21st. Referring to the first chart for the [fol. 451] week of May 6th-May 13th, there are no staff entries on the chart, and for this reason, the pen record cannot be verified. There are some figures in the place where the name of the gauge reader should be entered, but

I am unable to reconcile them as gauge readings, or with the pen record. The second chart, for the period of May 12th-19th, no staff gauge entry at the time the chart was set. At the time it was removed, there is a staff gauge entry of "1-6", which agrees with the pen record. The third chart, the week of May 19th-25th, has gauge entries and the pen record is in agreement. Referring to the chart for June 1st-June 8th, no gauge heighth entries whereby the pen record can be verified. The same statement applies to the chart of June 8th-14th; the same statement applies to the chart of June 14th-21st.

With reference to these charts, as well as the others I have testified to, as to what I mean by the statement that there is no staff gauge heighth entry, the form on the chart, near the center, provides for the gauge heighth at the time the chart is set and at the time it was removed. As previously testified, without such a control, there (481) is no assurance as to the validity of the pen record.

Mr. Greenwood: Complainant now offers its Exhibit No. 68, consisting of seven official gauge heighth chart records, constituting official original records in the office of the State Engineer of Colorado pertaining to the measurement of water from Sand Creek diverted by the Divide Ditch in the year 1928, and asks that the same be received as evidence in the record, and that we have permission to withdraw the original record and substitute in lieu thereof, photostatic copies of these records.

(Complainant's Exhibit No. 69 marked for identification.)

(Photostatic copies of three official gauge heighth charts on file in the office of the State Engineer of Colorado taken from the automatic register operated on the Divide or [fol. 452] Sand Creek Ditch covering the period of time from May 18th to June 2nd, 1926.)

(482) From the information contained on Complainant's Exhibit No. 69, consisting of three official gauge heighth record charts of the original records taken from the State Engineer's office of Colorado, relating to the measurement of water discharged by the Divide Ditch from Sand Creek for the year 1926, as to what they indicate as to how the record of diversion was kept, for the year 1926 I find but three weekly records, namely, from May 18th to June 2nd.

On the first chart, for the week of May 18th-May 23rd, I find a very indistinct figure for the staff gauge entry. I am unable to identify it. It may be a portion of the signature of the gauge observer at the time the chart was set. On May 23rd, when the chart was moved, the pen record shows 2.55 feet, the staff gauge entry is 2.65.

On the chart of May 23rd, I find the pen record starts with a gauge heighth of 2.5 feet, whereas the staff gauge reading is 2.65. No staff gauge entry when the chart was removed.

Referring to the chart of May 30th-June 2nd, I find that when the chart was set, the pen registered 2.15 feet, with a staff gauge entry of 2.9 feet, but no staff gauge entry when the chart was removed.

The records are difficult to interpret, due to the disagreement between the staff gauge heights, where they do occur, and the pen record, and, due to the absence of staff gauge readings in several instances. I class the record as a poor record. You could use the record, concerning which I have just testified, where the staff gauge heighth does not show the time when the chart is taken off or when the (483) pen record is set and the gauge chart put on, with very little confidence in determining the amount of discharge of water from a stream over the period supposed to be represented by the time this chart was on the register.

Mr. Greenwood: Complainant now offers its Exhibit 69, [fol. 453] consisting of three charts, and asks that it be received as evidence in the record with permission to withdraw the original record and substitute in lieu thereof, photostatic copies of the same.

(Complainant's Exhibit No. 70 marked for identification.)

(Photostatic copies of nine official gauge heighth charts on file in the office of the State Engineer of Colorado taken from the automatic register operated on the Divide or Sand Creek Ditch covering the period of time from May 19th to July 19th, 1927.)

(484) As to what Complainant's Exhibit No. 70, consisting of nine original records, being gauge heighth charts taken from the automatic register at Sand Creek, showing the diversion of water from Sand Creek by the Divide Ditch for the year 1927, indicates with reference to how the same

were kept and the manner in which the record of discharge of water from this ditch was derived, the records in question commence on May 19th, and end on July 19th, 1927. I find staff gauge entries on the first two charts, the chart of May 19th-26th, and May 26th-June 2nd. Those entries appear at the time the charts were set. It is difficult to read the figures, I do not know that I can identify them.

Commencing on June 2nd and continuing during the period of the records, no other staff gauge entries appear on the charts. For this reason, the pen record cannot be checked or verified, and the value of the record is extremely uncertain and doubtful.

The pen record appearing on all of these gauge heighth chart records, is a red ink line appearing on the chart, and, if correctly set, indicates the depth of water at the rating flume.

Mr. Greenwood: Complainant now offers its Exhibit 70, consisting of nine gauge heighth charts, original records in the office of the State Engineer of Colorado, relating to the record of discharge of water from Sand Creek by the [fol. 454] Divide Ditch for the year 1927, for the period indicated in these charts, and asks that the same be received as evidence in the record, with permission to substitute in lieu of the original records, photostatic copies thereof.

(485) (Complainant's Exhibit No. 71 marked for identification.)

(Photostatic copies of three official gauge heighth charts on file in the office of the State Engineer of Colorado taken from the automatic register operated on the Divide or Sand Creek Ditch covering the period of time from May 10th to May 27th, 1928.)

(486) As to what Complainant's Exhibit 71, consisting of three original gauge heighth record charts, official records from the office of the State Engineer of Colorado, made in connection with the record of diversion of water from Sand Creek by the Divide Ditch, indicates with reference to the manner in which the record of this diversion was kept, as to whether it was full and complete, reliable or unreliable, the records commence on May 10th and extend to May 27th, 1928. No staff gauge entries appear on any of the charts, and the pen records cannot be checked and are unverified.

Mr. Greenwood: Complainant now offers its Exhibit No. 71, consisting of three charts as previously identified, and asks that the same be admittted in the record as evidence with permission to withdraw the originals and substitute in lieu thereof, photostatic copies.

From the condition of the records, which have been identified as Complainant's Exhibits 66 to 71, inclusive, where those records fail to contain the proper entries so that the pen record can be verified, showing the period of time and the depth of water, and so forth, when they were installed, and during the period they were in operation, if there is no other means or other official record to determine the amount of diversion of the stream of Sand Creek during [fol. 455] that period of time, I could not, as an experienced man in the gauging of streams, in determining the amount of diversions of water, tell from those records with any degree of certainty, the volume that had been diverted, relying upon what those charts disclose.

(487) I made a comparative study of all of these charts, to which I have been testifying, for the year 1929, for instance, with the records of the water commissioner for the same period. Referring to the weekly report of water commissioner McAnnely, District 3, to the division engineer at Denver, I find that the last report covering the Sand Creek Ditch was entered in the report ending on July 13th, the mean daily discharge for the week being 11.3 second feet. Referring to the automatic gauge heighth charts, I find the chart record ended on July 18th, five days later, this indicating that the water commissioner had not reported all of the water diverted by the Sand Creek Ditch.

I made a computation of the gauge heights on the chart after July 13th, and applied the McAnnely rating table of 1922. This computation disclosed that slightly over 100 acre feet were diverted which were unreported, which is the differential in acre feet between what the gauge heighth chart for that period showed, as compared to the McAnnely weekly report.

I made the same comparison for other years, but I made no attempt to determine all of the inaccuracies; I only picked out the glaring inaccuracies. There are many others to which I have not testified.

(488) Mr. Howell: We move that that be stricken; he cannot testify to inaccuracies concerning which he has not already testified.

I do not think it is material to give testimony with reference to those inaccuracies; let us pass it.

I know and am familiar with the ditch commonly called or referred to as the Wilson Supply Ditch. The general [fol. 456] course of the ditch is in a northerly direction, and it diverts water from Deadman Creek to Sand Creek. I inspected this ditch on July 10th, 1929; I traversed the ditch from Deadman Creek to Sand Creek, took pictures, measured the quantity of water being diverted from Deadman to Sand Creek, and made general notes.

The purpose of the ditch is to divert water from the headwaters of Deadman Creek through this Wilson Supply Ditch to Sand Creek, and Sand Creek is thereafter used as a channel for a distanc of six or seven miles, where the water is again re-diverted by the Divide or Sand Creek Ditch and conveyed to Sheep Creek, a tributary of the Cache la Poudre River. The water that is diverted from Deadman Creek by the Wilson Supply Ditch, through the channel of Sand Creek, (489) is, together with Sand Creek water, diverted through the Divide or Eaton Ditch to Sheep Creek; and the testimony I have given with reference to the record of diversions from Sand Creek by the Divide Ditch would apply to Deadman water as well as to Sand Creek.

I have examined official records showing the quantity of water diverted from Deadman Creek to Sand Creek by the use of the Wilson Supply Ditch. I made extensive search of the records of the State Engineer's office at Denver with reference to water diverted from Deadman Creek to Sand Creek, and found no information whatever showing these diversions.

I made a search of the records and conferred with the state water officials and was informed by them that there were no such records. I found no annual report of the water commissioner of District 3 showing the diversions from Deadman to Sand Creek. I did not find any weekly report showing such diversions by the Wilson Supply Ditch from Deadman to Sand Creek. The only record pertaining to diversions from Deadman are those kept in conjunction

with the diversions (490) from Sand Creek, but from those records, one is not able to segregate the Sand Creek water from the Deadman water; there is no independent record.

[fol. 457] At the time I visited the Wilson Supply Ditch in July, 1929, I found a wooden rating flume just above the point where the ditch discharges into Sand Creek. No staff or automatic gauge were found in the rating flume. The equipment I found there on my visit in July was not sufficient in itself to record the discharge of water. There were no recording devices in operation; I could not find any staff gauge.

I measured the water passing through the Wilson Supply Ditch from Deadman to Sand Creek on July 10th, 1929, and found 3.5 second feet. I also measured, on July 12th, 1929, the diversions from Sand Creek to Sheep Creek by the Divide Ditch, and determined by my measurement, 8.6 second feet to be passing from Sand Creek through the (491) Divide Ditch to Sheep Creek.

There were no adverse conditions as to variation in stream flow prevailing in that vicinity that would affect the runoff from Deadman Creek and Sand Creek in the interim of time between my measurement of Deadman on July 10th and my measurement of Sand Creek on July 12th—nothing that would affect the stream flow, except in a normal way.

From my measurement of July 10th at Deadman, and Sand Creek on July 12th, I determined roughly that forty per cent of the water was coming from Deadman Creek, and sixty per cent from Sand Creek. On the date of my measurement of Sand Creek on July 12th, 1929, I observed that the entire flow of Sand Creek above the diversion works was being diverted through the Divide Ditch.

Deadman Creek is a tributary of the Laramie River. Its (492) water, when controlled by the Wilson Supply Ditch and the Sand Creek Ditch and Sand Creek and the Divide Ditch, eventually goes into the Cache la Poudre Basin. From the blue print map attached to Complainant's Exhibit No. 5, which is a certified copy of the statement of claim of the Wilson Supply Ditch by the owner, Phillip Wilson, I find that the headgate of the Wilson Supply Ditch is located on Deadman Creek, 750 feet due north of the

southeast corner of Section 15, Township 10 North, Range 75 West.

[fol. 458] I made an inspection on September 16th to the 19th, inclusive, 1932, of the various ditches in Colorado diverting water from the Laramie River on what is known as the meadow lands, and particularly with reference to the headgates and rating flumes of the ditches in that vicinity. Mr. Goyne Drummond accompanied me.

We visited and inspected sixty-four ditches, of which eighteen diverted water from the Laramie, and forty-six, from tributaries. The specific purpose of the trip was to inspect these ditches as to whether they had headgates or rating flumes. Of the number of ditches (493) diverting water from the Laramie River, eleven, or 61 per cent, did not have headgates. Of the number of ditches on the tributaries of the Laramie River, twenty-nine, or 63 per cent, were without headgates.

The portion of the river, or the territory in the river valley which we examined with reference to these ditches and headgates, extended from the Colorado-Wyoming state line up to Atmore Lodge, which is located three miles above the Glendevey gauging station and approximately eight miles below the Laramie-Poudre Tunnel. There are several other ditches that I know of diverting water above Atmore Lodge, which I did not visit. Atmore Lodge is approximately eight miles down stream toward the state line from the intake of the tunnel.

Of the sixty-four ditches on the Laramie and the tributaries of the Laramie, but four had rating flumes, one of which diverts (494) water from the Laramie River, and the remaining three, from tributaries of the Laramie. The diversion of water by these various ditches was usually accomplished by loose rock dams, set diagonally across the stream. I would class the diversion works thus used as semi-permanent, because some of them would last for a considerable period, while others would have to be repaired each year; they were primitive and crude in their construction.

As an irrigation engineer, with experience in the distribution and administration of water in Colorado, I would class [fol. 459] administrative distribution of water in Water District 48 on what are known as the Meadow Lands in Colorado, as extremely crude. Without headgates, it is difficult

to exclude water from ditches or to control the amount diverted; without rating flumes and gauge rods, the measurement of water is difficult and would be based largely upon estimates and guesses.

These ditches that divert from the Laramie River for the irrigation of Meadow Lands in Colorado are located in mountainous territory (495) at an altitude, I would say offhand, from about eight thousand feet to eighty-five hundred. As to my previous testimony referring particularly to the Skyline Ditch and the Laramie-Poudre Tunnel and trans-mountain diversion ditches regarding the degree of diurnal fluctuation and diversion of water, as to whether or not that same condition would be found as to the amount of water that would be diverted from these Meadow Land ditches, the diurnal fluctuations on the Laramie River and its tributaries are pronounced, due to the chief sources of the water supply of these streams being derived from melting snow fields, which respond quickly to changes in temperature conditions.

In my inspection of these Meadow Land ditches, either from the Laramie proper or from its tributaries, I did not observe any automatic gauges installed for recording the discharge in the ditches. I prepared a memorandum or table listing the various ditches, as to whether they are from the Laramie proper or from its tributaries, and showing the conditions existing at the time of my visit. This table gives the name of the ditch, the stream from which it diverts water, whether it has a headgate or not and the condition, if it has; whether it has a rating flume or not, and the condition, if it has. I have such table available.

(Complainant's Exhibit No. 72 marked for identification.)

(Statement prepared by R. I. Meeker from field trip of September 16th to 19th, 1932, showing condition of headgates and rating flumes on the Meadow Land ditches from the Laramie River and tributaries in Water District 48 in Colorado.)

[fol. 460] COMPLAINANT'S EXHIBIT No. 72

Laramie River, Colorado

Condition of Headgates and Rating Flumes,

Meadow Ditches

R. I. Meeker & Goyne Drummond, Engineers,

Sept. 16-19, 1932

Commencing on the afternoon of Sept. 16th, R. I. Meeker and Goyne Drummond inspected the headgates and rating flumes of the Colorado Meadow Ditches from the Laramie River. The work was terminated on Sept. 19th at noon. The attached table summarizes the condition of diversion structures and measuring devices, and shows that of 64 ditches, 24 had headgates, 4 had rating flumes (of which but two were serviceable) 1 gauge rod was observed in 1 rating flume.

Under these conditions control of ditch diversions appears as virtually nonexistant, and measurement of water a farce, notwithstanding the yearly reports of Water Commissioner Mosher of District 48 filed with the State Engineer of Colorado. One ditch was found not included in the plane table survey of the Meadow Ditches by Wyoming of 1929-30. This ditch diverts water from Forester Creek about ½ mile above the Forester Creek Ditch and conveys water to land on the Mesa east of the Ballard Ranch on Grace Creek.

The Laramie-Poudre Tunnel was diverting about 18 second-feet on Sept. 17th, 8:00 a. m. On Sept. 16th, 2:40 p. m., 28 second-feet were passing across the Colorado Line in the Laramie River to Wyoming. Ditch diversions had practically ceased by the Colorado Meadow Ditches.

L. E. Sholine reports engineers, surveying a ditch from McIntyre Creek at a high elevation, presumably a part of the Laramie-Poudre Collection System.

[fol. 461] Conditions of Headgates and Rating Flumes

Meadow Ditches from Laramie River and Tributaries in Colorado, Water District #48

Field Trip of Sept. 16-19, 1932, by R. I. Meeker and Goyne Drummond, Engineers, Arranged from Head Down, both on Main Streams and Tributaries
Prepared by R. I. Meeker, Irrigation Engineer, September 20, 1932

Stream	Ditch	Headgate & Condition	Relating Flume & Condition
Laramie Main River	Link No. 1	No	No
	Parker	Yes, poor, from Slough	Yes, poor
	Timothy	No	No
	Wrights	Yes, fair	No
	Martin No. 1	Yes, good	No
	Martin No. 2	No, washed out	No
	Upper Hills	No	No Evidence of old R. F.
	Hills	No	No Evidence of old R. F.
	Unnamed	?	?
	Smith Brown	No	No Remains of old R. F.
	Yelton	No	No Remains of old R. F.
	Jimmy Cr. Ext	No	No Remains of old R. F.
	Ferguson	No	No
	Detro No. 2	Yes, very poor condition	No
	Mansfield	Yes, old and poor condition	No
	Mansfield No. 2	Yes, very old, partly rotted out	No
	Bliler & Boswell	Yes, old and poor condition	No
	Warren	No evidence of old H. G.	No
Totals	18	7	1
Tributaries:			
Link Cr.	Link No. 2	No	No
Deadman Cr.	Davy	Yes, fair	Yes, good tack gage on side
Nunn Cr.	Brown	Yes, 1st class	No
Stub Cr.	Cabin	Yes, good	No
	Stub	Yes, good	No
Brown Cr.	Forrester	No, empties into Brown D.	No
Petes Cr.	Unnamed	No	No
Lonetree Cr.	Unnamed	No	No
McIntyre	Talmage	Yes, good	No
[fol. 462]	McIntyre	Yes, good concrete	No
	Comet	No	No
	Stuart #2	No, not used for long time, cannot divert present cond.	No
	Grants (Homestead)	Yes, fair	No
	Lamb	No	No
Pine Cr.	Pine Cr.	No	No
Roaring Fk.	Comet	No	No
Brush	Unnamed	No	No

Conditions of Headgates and Rating Flumes—Continued

Stream	Ditch	Headgate & Condition	Relating Flume & Condition
Unnamed	Homestead	No	No
Stuart	Stuart	No	No
Jimmy Cr.	Jim No. 1	No	No
	Jim No. 2	No	No
	Jim No. 3	Yes, fair	No
	Jim No. 4	No	No
	Ward #2	Yes, fair	Yes, of no value, old and out of repair
	Ward #1	No	Yes, new, leakage underneath
	Unnamed Ditch	No	No
	Ollie	No	No
	Jimmy Cr.	No	No
Trollope Cr.	Trollope #1	No	No
	Trollope #2	No, check gate in cr.	No
	Trollope #3	Yes, fair	No
LaGarde Cr.	LaGarde #1	Yes, fair	No
	LaGarde	Yes, good	No
McGuire Cr.	Nellie	No (Drummond) Diverts water into McIntyre Drainage	No (Drummond)
Brush Cr.	Schnitger	No, old, rotted H. G. of no value	No
	Pache	Yes, excellent condition	No
Little Jenkins	Homestead #2	No	No
	Unnamed	No	No
Big Jenkins	Homestead #1	No	No
	Unnamed	No	No
Forrester Cr.	Unnamed to Ballard R.	?	?
	Forrester	No	No
	Dietro #1	Yes, fair	No
Grace Cr.	Grace	Yes, fair Enlarging and cleaning 800 ft. of ditch near upper end.	No
	Hance	Yes, very poor cond., displaced	No
Stuck Cr.	Stuck, left bank	Yes, new, good cond.	No
	right bank	No	No
Totals	46	17	3

Summary:	Ditches	Headgates	Rating	Flumes
Laramie R.	18	7	39%	1
Tributaries	46	17	37%	3
Totals	64	24		4
%	100	37%		6%

[fol. 463]

River Conditions

Laramie River at State Line Station: Sept. 16, 1932, 2:40 P. M. G. H. 0.94 (outside enameled gage on bridge abutment) 28 Sec.-Ft. from Rating Table.

Laramie River at Glendevey Station: Sept. 18, 1932, 9:00 A. M. G. H. 0.59. Enameled staff gage, outside ± 12 Sec.-Ft. in river; est. only, see Rating Table at Denver.

Laramie-Poudre Inlet Canal from Laramie River: Sept. 17, 8:00 A. M. at Venturi, Flume (wood) Throat sanded up, not functioning. Throat width 12.1 ft. 14.3′ W × 0.75 Ft. − 10.7 − Ft. × ± 1.7 = ± 18 Sec.-Ft. Div.

Note: L. E. Sholine reports engineer at work on survey McIntyre extension of Laramie-Poudre System, Aug. or Sept., 1932.

R. I. Meeker, Sept. 20, 1932.

[fol. 464] (496) Complainant's Exhibit No. 72 was prepared by myself, based upon a field trip of September 16th to the 19th. The heading is "Condition of headgates and rating flumes, Meadow Ditches from Laramie River and tributaries, in Colorado, Water District 48." The table, as previously stated, gives the stream from which each ditch diverts, the name of the ditch, headgate and condition, rating flume and condition, with a summary on the second page of the number of ditches from the Laramie River or its tributaries, indicating the number of headgates, the number of rating flumes, and the per cents.

(Complainant's Exhibit No. 72 offered in evidence.)

The information contained in Exhibit 72 correctly states the condition of the ditches as I found them at the time of my visit and was taken from my field book which I have here. The notes in the field book were made at the time of the visit.

Referring to Exhibit 72, there are two or three abbreviations on the table I might explain. On Page 1 of Exhibit 72, in the last column opposite the Upper Hills Ditch, is the following notation, "evidence of old R. F." The "R. F." is a shortening for "rating flume"; it stands for "rating flume". That appears on three other ditches immediately below.

(497) Mr. Greenwood: We renew the offer of Exhibit No. 72.

I got the names of the various ditches I have listed in this memorandum, Exhibit 72, from the field trip and Mr. Goyne Drummond's acquaintance with the ditches from his field

trips and surveys taken in conjunction with the description of the headgates to be found in the tables of decrees of the Laramie River for Water District 48, on file in the State Engineer's office in Denver.

Mr. Howell: The defendant objects to the introduction of Complainant's Exhibit 72 for the reason that the designations here apparently as to the condition of the ditches are without any explanation, and a mere conclusion of the witness, and, moreover, the exhibit purports to be a con- [fol. 465] clusion of both this witness and another—Goyne Drummond—who has not testified in the case as far as this exhibit is concerned, and whatever his testimony may be, so far as his participating in this investigation is concerned, is pure hearsay. We further object on the ground that the witness has testified that he ascertained the names of these ditches from the engineer's office in Colorado, and there has been no evidence, except pure hearsay, tending to show how the ditches were located under the names given on this exhibit. We further object on the ground that the exhibit is incompetent, irrelevant and immaterial, and does not tend to prove or disprove any issue in this case.

Accurate records of the actual amount discharged from (498) or diverted by the various Meadow Land ditches, considering the character of flow and daily fluctuation in the runoff of the Laramie River and tributaries, cannot be made in the absence of automatic registering devices being installed for measuring the discharge, due to the changing conditions of the river from day to day, and within the day.

From my observation of these ditches, as made at the time I visited this territory for the purpose of inspecting the same, I would say that in a great many instances where there were no headgates, it was quite obvious from the conditions at the entering of the water into the ditch, from debris and general conditions, that no control had been exerted to regulate the amount of water that is diverted by these ditches and they diverted in accordance with the rise and fall of the water in the stream. That applies to ditches without headgates.

I examined the files in the office of the State Engineer at Denver with reference to determining whether the rating tables are on file for these various Meadow Land ditches in Colorado, diverting water from the Laramie River and its

[fol. 466] tributaries for irrigation of these Meadows in District 48, and that search disclosed that the ditches in Water District 48 had not been rated since 1912 and 1913, a matter of twenty years time. In other words, I did not find on file any rating table later than 1912 or 1913, and I think the original records are in (499) Mr. Hinderlider's baggage. As far as the official records disclosed from my search, they had not been rated since 1912 or 1913.

I have examined and studied the field books of the water commissioner of District 48, which contain the records of the water commissioner of District 48, Laramie River and tributaries in Colorado. I found such records in the office of the State Engineer of Colorado, and have them here. I have the field books of the water commissioner of District 48 for the years 1926 to 1932, inclusive, as furnished me by Mr. Hinderlider.

As to what those field books disclose with reference to the irrigation of the Meadow Lands in District 48 in Colorado, I find, in studying the entries of visits of the water commissioners to the various ditches, that they were visited infrequently. This applies to both the ditches of the Laramie River and its tributaries. Seldom more than eight or nine trips were made every year, and frequently, as little as two or three visits per year. Referring specifically to the field book of water District 48 for the year 1926, I find that on the Brown Ditch, which diverts water from Nunn Creek, page 2 of the record, (500) there are six entries for the year.

The "entry" is the date on which the ditch was visited, and the heading is the "amount of river water in the ditch." These field books, as to their use, are a book kept by the commissioner in which he is supposed to enter data at the time of his visits and inspections and record his action in connection with this administraton of this water; it shows the quantity of water being diverted at the times of his trips, with a summary for the year; also, information on [fol. 467] the priorities, names of the ditches, the acres irrigated, and related matters. Later it is sent into the engineer's office. It contains reference to the amount of water which the ditch is entitled to divert—I find the priority number, with the amount of the decree as entered; and also, what is diverted. The table at the left of each page is

headed to show the date and the amount of water being diverted by the ditch.

Referring to the Comet Ditch, page 6, from the McIntyre Creek, I find five entries for the year 1926. Referring to the Detro No. 1, page 8, from Forrester Creek, I find three entries. Referring to the Navy Ditch from Deadman Creek, page 10, I find five entries for the year. Referring to the Forrester Creek Ditch, from Forrester Creek, page 14, I find two entries for the year. Referring to the Hills Ditch from the Big Laramie, page 22, I find four entries for the (501) year. Referring to the Homestead Ditch from McIntyre Creek, page 24, I find five entries for the year. Referring to the Jimmy Creek Ditch, from Jimmy Creek, page 28, I find four entries for the year. Referring to the Lamb Ditch from the McIntyre, page 32, I find seven entries for the year. Referring to the Mansfield No. 2 Ditch from the Big Laramie, and on the west side of the river, page 39, I find three entries for the year with a maximum diversion reported of 21 second feet on June 16th. Referring to the Parker Ditch from the Big Laramie, Page 47, four entries for the year. Referring to the Smith-Brown Ditch from the Big Laramie, page 50, four entries for the year.

Referring to the water commissioner's field book, District 48, for the year 1927, which is a different book from which I have been testifying——

With reference, again, to 1926, as to who the water commissioner of that district was, there is a page in the back of the book where the water commissioner's signature is shown, at page 90—R. A. Mosier. I do not know his signature and would not say for sure that it (502) is his. [fol. 468] The signature is sworn to and subscribed on the 12th day of November, 1926, before A. M. Spaulding, notary public.

(503) (Reading from page 89, water commissioner's field book, District 48, State of Colorado, 1926:)

"The information given herein was obtained through careful observation and by consulting the various landowners or foremen of ranches. I obtained from water users the first and last day water was run. Reports of the average daily amount of water carried was from conservative estimates and measurements on the different ditches. Crop

reports was made from estimates as to the yield per acre given by ranch owners. Total number of acres irrigated in Water District 48 was about 8,311 acres. Total acres of natural hay land about 6,425 acres. Total number of tonnage of native hay produced per acre per season of 1926 about ton per acre, or 6,425 tons."

Having had handed to me water commissioner's field book for District 48, State of Colorado, for the year 1927, which was signed (504) by R. A. Mosier, title "water commissioner", which book is published by the State Engineer of Colorado at Denver, and examining this document so far as it pertains to the irrigation of the Meadow Lands in Colorado from the Laramie River, as to whether it discloses the manner in which the administration of the waters in the irrigation of these Meadow Lands was carried on, the number of acres of land that were irrigated—I shall refer directly to the number of observations made by the water commissioner. By "observations", I mean the number of trips of the water commissioner to any specific ditch during the year for the purpose of administration, wherein he gives the date, and the amount of water being diverted by the ditch in second feet.

Referring to page 1, the Bliler and Boswell Ditch from the Laramie River, five observations; I find an additional note under "new diversions, two items". Referring to the Brown Ditch from Porter Creek, page 3, one observation during the season. Referring to the Comet Ditch from McIntyre Creek, page 6, seven observations for the season. [fol. 469] Referring to the Davy Ditch from Deadman Creek, page 10, four observations for the season. Referring to the Ferguson Ditch from the Big Laramie, east side, page 16, four observations by the water commissioner for the season. Referring to the Hills Ditch from the Big Laramie (505) River, page 21, five observations for the season. Referring to the Homestead Ditch from McIntyre Creek, page 23, seven observations for the season. Referring to the Lamb Ditch from McIntyre Creek, page 31, six observations for the season. Referring to the Charles E. Lanning Ditch from the Big Laramie, page 35, two observations for the season. Referring to the Mansfield Ditch, an enlargement from the Big Laramie, page 37, four observations for the season. Referring to the McIntyre Ditch from McIntyre Creek, page 41, eight observations

for the season. Referring to the Parker Ditch from Big Laramie, page 46, five observations for the season. Referring to the Smith-Brown Ditch from the Big Laramie, page 49, three observations for the season. Referring to the Stuart No. 2 Ditch from McIntyre Creek, page 51, seven observations for the season. Referring to the Timothy Ditch from the Big Laramie, page 64, seven observations for the season. Referring to the Yelton Ditch from the Big Laramie, page 68, four observations for the season.

Referring to page 89, I quote—"all information given herein was obtained through careful observation and by consulting the various landowners or foremen of ranches. Obtained from the water users the first and last day water was run. Reports on the average daily amount of water used are from measurements and conservative estimates on the different ditches. Crop reports are made from estimates as to yield per acre given me by ranch owners. Total number of acres irrigated in Water District 48 was about 8,076 acres. Total number of (506) acres of grasses cut for hay this season 5,972 acres. Total number of tonnage of native hay produced per season is about 4,479 ton, or three-quarters ton per acre. Hay crop is short in this district this season on account of late spring and exceptionally cool summer."

[fol. 470] In testifying as to the book for the year 1926, I mentioned the word "entries" as meaning the number of visits—that is synonymous with "observations."

I have in my possession field book of the water commissioner of District 48 for the year 1928. I will give the number of trips or observations made by the water commissioner for the season as indicated. In the first and second columns of the various pages ——

Referring to the Brown Ditch from Nunn Creek, page 2, I find five entries or observations by the water commissioner, showing the quantities of water diverted. Referring to the Brinker Ditch from Brinker Creek, page 5, I find four observations showing the quantity of water diverted for the season. Referring to page 7, the Cabin Ditch from Stub Creek, I find four entries of visits by the water commissioner. Referring to the Davy Ditch from Deadman Creek, page 10, three entries of observations. Referring to the Forrester Ditch from Brown Creek, page 13, two entries of observations by the water commissioner. Refer-

ring to the Ferguson Ditch from the Big Laramie, page 16, I find seven (507) entries of observations by the water commissioner. Referring to the Hills Upper Ditch, Big Laramie, page 22, three observations by the water commissioner. Referring to the Homestead Ditch from McIntyre Creek, page 23, I find eight observations or entries by the water commissioner. Referring to the Hance Ditch from Grace Creek, page 26, five entries by the water commissioner of water being diverted. La Garde, an enlargement Ditch, from La Garde Creek, page 29, four observations of water being diverted. Page 31, the Lamb Ditch from McIntyre Creek, six entries by the water commissioner. Referring to Link No. 2, an enlargement ditch from Link Creek, page 33, five entries by the water commissioner of water being diverted. Referring to Mansfield, an enlargement ditch, page 37, from the Big Laramie River, seven entries by the water commissioner. Referring to the McIntyre Ditch from McIntyre Creek, page 41, seven entries by the water commissioner. At page 45, the Pache [fol. 471] Ditch from La Garde Creek, four entries by the water commissioner. Referring to the Smiths-Brown Ditch from the Big Laramie, page 49, six entries of water being diverted by the water commissioner. Springer Ditch from the Big Laramie, page 57, three entries by the water commissioner of water being diverted. Timothy Ditch from the Big Laramie, page 64, seven entries by the water commissioner. Yelton Ditch from the Big Laramie, page 69, seven entries of water being diverted.

Referring to page 89, I read:

"The information given herein was obtained through careful observations and by consulting the (508) various landowners or foremen on ranches. I obtained from the water users the first and last day water was run. Reports on the average daily amount of water run are from conservative estimates and measurements on the different ditches. Crop reports are made from estimates as to yield per acre given by ranch owners. Total number of acres irrigated in District 48 for this season 1928, 8,266 acres. Total number of acres of natural hay land 7,222. Total acreage cut for hay 5,622 acres. Total number of acres of hay land not used for hay but used for grazing, 1,600. Total number of tonnage of native hay produced for season 1928 is about one ton per acre, or 5,622 tons."

The information contained in that document, as well as the one I referred to for the years 1926 and 1927, is sworn to or verified. On page 90 of each book, is the form whereby the water commissioner subscribes and swears to his record. (Reading the form of oath that was taken there:)

"STATE OF WYOMING,
County of Albany, ss:

I, R. A. Mosier, of lawful age, being first duly sworn, depose and say that I am the duly appointed water commissioner of District 48; that the contents of this book are true and correct copy of the records of said water district for the year ——, and that the items herein contained are true to the best of my knowledge and belief.

[fol. 472] (Signed) R. A. Mosier, Water Commissioner District 48. (Seal.)

(509) Subscribed and sworn to before me this 8th day of November, A. D., 1929.

(Signed) D. E. Fitts, Notary Public."

My commission expires January 8th, 1930.

That is for the year 1929. The books for the years 1926, 1927 and 1928 contain a similar oath; the records have been sworn to for the years 1926, 1927, 1928 and 1929.

Continuing with the field book for the year 1929 of Water District 48 of the State of Colorado, I will refer specifically to the number of observations of water being diverted, as entered by the water commissioner in this book.

Referring to the Bliler and Boswell Ditch from the Big Laramie, page 1, old diversion, four entries of water being diverted, by the water commissioner. I also find the note "third year new diversions," four observations. Referring to the Brown Ditch from Porter Creek, four entries by the water commissioner, at page 3. Referring to the Comet Ditch from McIntyre Creek, page 6, six observations of water diverted for the season. Referring to the Davy Ditch from Deadman Creek, page 10, six observations of water being diverted. Forrester Creek No. 2 Ditch, from Forrester Creek, page 15, four observations of water being diverted. Grace Creek enlargement, from Grace Creek, page (510) 20, four entries of water being diverted, as entered by the water commissioner. Homestead Ditch from

McIntyre Creek, page 23, six entries of water being diverted. Homestead No. 2 Ditch from Little Jenkins Creek, four entries of water being diverted, at page 25. Jim Ditch from Jim Creek, page 27, four entries showing water diverted for the season. La Garde No. 1 Ditch from La Garde Creek, page 30, six entries of water diverted, as recorded by the water commissioner. Lone Tree Ditch from Lone Tree Creek, page 34, six entries of water diverted during [fol. 473] the season. Mansfield, an enlargement ditch, page 37, from Big Laramie headgate, east side of the river, four entries of water diverted during the season. Martin No. 1 Ditch from the Big Laramie, page 39, six entries of water diverted as recorded by the water commissioner. McIntyre Ditch from McIntyre Creek, page 41, four entries of water diverted during the season. Ollie Ditch from Jimmy Creek, page 44, four observations of water diverted for the season. Pine Creek, an enlargement ditch, from Pine Creek, page 47, five entries showing water diverted during the season. Smiths-Brown Ditch from Big Laramie, page 49, five entries of water diverted during the year. Wrights Ditch from the Big Laramie, page 68, five entries of water diverted for the irrigation season.

Referring to Page 89:

"The information given herein was (511) obtained through careful observation and by consulting the various landowners or foremen of ranches. I obtained from the water users the first and last day water was run. Reports of the average daily amount of water run are from conservative estimates and measurements on the different ditches. Crop reports are made from estimates as to yield per acre given by ranch owner. Total number of acres irrigated in District 48 for this season—1929—8,436 acres. Total number of acres of natural hay land 7,247. Total acreage cut for hay 5,947 acres. Total number of acres of hay land not cut for hay but used for grazing, 1,300 acres. Total number of tons of native hay produced for the season 1929 is about 5,947 tons, or about one ton per acre."

This report is sworn to on page 90 by Mr. Mosier on the 8th day of November, 1929.

I have a field book for Water District 48 of the State of Colorado for the year 1930, which is the water commissioner's report to the State Engineer for that year. As to

what that record discloses with reference to the manner in which the administration of water was carried on that year in the Meadow Lands in Colorado, referring specifically to the entries by the water commissioner, giving dates with quantities of water diverted during the season, I find [fol. 474] for the Brown Ditch from Nunn Creek, page 2, five entries of water diverted during the season. (512) Brinker Ditch from Brinker Creek, page 5, two entries for the season. Comet Ditch from McIntyre Creek, page 6, ten entries of water diverted during the season. Detro No. 1 from Forrester Creek, page 8, four entries of water diverted during the season. Ferguson Ditch from Big Laramie, east side, page 16, five entries of water diverted during the season. Grants Ditch from Roaring Creek, page 19, no entries as to water diverted, and, "under construction". Grace Creek, an enlargement ditch from Grace Creek, page 20, five entries of water diverted during the season. Hills Ditch from Big Laramie, page 21, eight entries of water diverted during the season. Homestead Ditch from McIntyre Creek, page 23, nine entries of water diverted during the irrigation season. Homestead No. 2 Ditch, from Little Jenkins Creek, south branch, five entries of water diverted during the season, at page 25. Jim Ditch from Jim Creek, page 27, eight observations of water diverted during the season. Jimmy Creek Extension, an enlargement ditch, from Jimmy Creek and Laramie River, page 28, six observations of water diverted during the season. Also down on the page, I find for the Jim Creek Ditch, five entries showing water diverted for the season. Lamb Ditch from McIntyre Creek, page 31, eight entries of water diverted during the season. Link No. 1 Ditch from the Laramie River, page 32, five entries (513) of water diverted during the season. Charles E. Lanning from the Big Laramie, page 35, two entries. Mansfield, an enlargement ditch from the Big Laramie, east side, page 37, five entries of water diverted during the season. Mansfield No. 2, an enlargement ditch from the Big Laramie, west side, page 38, five observations of water diverted during the season. McIntyre Ditch from McIntyre Creek, page 41, eight entries of water diverted during the season. Nellie Ditch from McGuire Creek, page 43, ten entries of water diverted during the season. Nunn Creek Ditch from Nunn Creek, page 42, two entries of water diverted during [fol. 475] the season. Pache Ditch from La Garde Creek, page

45, five entries of water diverted during the season. Pine Creek, an extension ditch from Pine Creek, page 47, eight entries of water diverted during the season. Smiths-Brown Ditch from the Big Laramie, page 49, eight entries shown of water diverted during the season. Stuart No. 2 Ditch from McIntyre Creek, page 51, three entries of water diverted during the season. Stub Creek Ditch from Stub Creek, page 59, seven entries of water diverted during the season. Schnitger Ditch from La Garde Creek, page 60, five entries of water diverted. Talmadge Ditch from McIntyre Creek, page 63, six entries of water diverted during the season. Ward No. 1 Ditch from Jimmy Creek, page 67, eight entries of water diverted during (514) the season. On the same page, Ward No. 2 from Jimmy Creek, eight entries of water diverted during the season. Yelton Ditch from Big Laramie, page 69, seven entries of water diverted during the season.

Referring to the page 89, I quote:

"The information given herein was obtained through careful observation and by consulting the various landowners or foremen on ranches. I obtained from the water users the first and last day water was run. Reports of the average daily amount of water run are from conservative estimates and measurements on the different ditches. Crop reports are made from estimates as to yield per acre given by ranch owner. Total number of acres irrigated in District 48 obtained from the owners of ranches. A portion of this acreage is sagebrush land. About 8,426 acres can be irrigated. Total acreage cut of hay land in Water District 48 was 6,170 acres. Cut-over acres not cut, 410, equals all acreage estimated. There is about 6,517 acres irrigated. Total number of tons of hay produced in District 48 was about 6,100 tons, or an average of about one ton per acre."

That report was signed by R. A. Mosier, water commissioner, the 15th day of November, 1930.

I have a similar report or field book for 1931 of the water commissioner of District 48. My statements will now apply to the quantities of water diverted by the various ditches [fol. 476] as entered by the (515) water commissioner, that is, to the visits during the period of administration, and not to specific quantities.

Referring to the Brown Ditch from Nunn Creek, page 2, five entries of water diverted during the year. Ben War-

ren Ditch, near tunnel, from Big Laramie River, west side, page 4, three entries by the water commissioner. Comet Ditch from McIntyre Creek, page 6, nine entries of water diverted, as observed by the water commissioner. Cabin Ditch from Stub Creek, page 7, six entries of water diverted during the season. Detro No. 2 Ditch from Big Laramie, page 9, five entries of water diverted during the season. Forrester Ditch from Brown Creek, page 13, six entries of water diverted during the season. Forester Creek No. 2 Ditch from Forrester Creek, page 15, four entries of water diverted during the season. Frenchwoman Ditch from Frenchwoman Creek, page 17, seven entries of water diverted during the season. Grants Ditch from Roaring Creek, page 19, no entries. Hills Ditch from Big Laramie, page 21, five entries of water diverted during the season. Homestead Ditch from McIntyre Creek, page 23, nine entries of water diverted during the season. Homestead No. 1 Ditch from Big Jenkins Creek, Page 24, six entries of water diverted during the season. Jim (516) Ditch from Jim Creek, page 27, six entries of water diverted during the season. Lamb Ditch from McIntyre Creek, page 31, six entries of water diverted during the season. Link No. 1 from Big Laramie, page 32, five entries of water diverted during the year. Charles E. Lanning Ditch from Laramie, page 35, headgate near tunnel, three entries of water diverted during the season. Mansfield, an enlargement Ditch from Laramie, headgate east side, page 37, five entries of water diverted during the season. Martin No. 1 Ditch from Laramie, east side, page 39, four entries of water diverted during the season. Nellie Ditch from McGuire Creek, page 43, nine entries of water diverted during the season. Ollie Ditch from Jimmy Creek, page 44, six entries of water di- [fol. 477] verted during the season. Parker Ditch from Laramie River, page 46, six entries of water diverted during the season. Stuck Ditch from Stuck Creek, page 48, seven entries of water diverted during the season. Smiths-Brown Ditch from Laramie River, page 49, seven entries of water diverted during the season. Stuart Ditch from Stuart Creek, page 50, nine entries of water diverted during the season. Stub Creek Ditch from Stub Creek, six entries of water diverted during the season, page 59. Talmadge No. 1 Ditch from McIntyre Creek, page 63, six entries of water diverted during the season. Thompson Ditch from British Creek, page 65, nine entries of water diverted during the

season. Warren Ditch from (517) Laramie River, page 67, seven entries of water diverted during the season.

Referring to page 89, I read:

"The information given herein was obtained through careful observation and by consulting the various landowners or foremen of ranches. I obtained from water users the first and last days water was run. Reports of the average daily amount of water run was from conservative estimates and measurements on the different ditches. Crop reports are made from estimates as to yield per acre given by ranch owners. Total number of acres irrigated in District 48 for the season 1931, about 7,710 acres. Total number of acres of meadow land cut for hay in season 1931, approximately 6,291 acres. Estimated tonnage of hay produced in 1931, 4,718 tons, or about three-quarters tons per acre. Total number of acre feet diverted in Water District 48 for ranches, 39,183 acre feet for 7,710 acres, 5 acre feet per acre."

Continuing on page 90—"According to a recent survey made of the irrigated lands of the Laramie River Valley, I am informed the total amount of meadow land irrigated in Water District 48 is 4,242 acres. This amount does not include land irrigated on Sand Creek. 39,183 acre feet of water run for 7,710 acres of land, or about 5 acre feet per acre for the season. It has been conceded by irrigation en- [fol. 478] gineers that about 85 per cent of all water used in irrigation returns to natural water courses, leaving approximately 15 per cent retained on the land. This would equal .76 of an acre foot for each acre irrigated this season." Sworn to by R. A. Mosier.

I have a similar report of Water District 48 of the State of Colorado for the year 1932.

(518) With reference to entries by the water commissioner of water diverted by the various ditches—the Brown Ditch from Porter Creek, page 3, two entries of water diverted during the season. The Brown Ditch from Nunn Creek, page 2, seven entries of water diverted during the season. The Brinker Ditch from Brinker Creek, east side, page 5, three entries of water diverted during the season. Cabin Ditch from Stub Creek, page 7, seven entries of water diverted during the season. Detro No. 1 Ditch from Forrester Creek, page 8, seven entries of water diverted during the

season. The Davy Ditch from Deadman Creek, page 10, seven entries of water diverted during the season. Forrester Creek Ditch from Forrester Creek, page 14, seven entries of water diverted during the season. Ferguson Ditch from Big Laramie River, east side, page 16, seven entries of water diverted during the season. Grace Creek enlargement from Grace Creek, page 40, eight entries of water diverted during the season. Hills Ditch from Big Laramie, page 21, eight entries of water diverted during the season. Hills Upper Ditch from Laramie, page 22, nine entries of water diverted during the season. Homestead No. 1 Ditch from Big Jenkins Creek, page 24, six entries of water diverted during the season. Hance Ditch from Grace Creek, page 26, eight (519) entries of water diverted during the season. La Garde, an enlargement ditch from La Garde Creek, page 29, eight entries of water diverted during the season. La Garde No. 1 from La Garde Creek, page 30, six entries of water diverted during the season. The Lamb Ditch from McIntyre Creek, page 31, nine entries of water diverted during the season. Link No. 2 Ditch from Big Laramie, Link Creek, west side, six entries of water diverted [fol. 479] during the season, page 33. Lone Tree Ditch from Lone Tree Creek, page 34, seven entries of water diverted during the season. Mansfield, an enlargement from the Laramie River, headgate east side, page 37, eight entries of water diverted during the season. Mansfield No. 2, an enlargement ditch from the Laramie River, west side, page 38, nine entries of water diverted during the season. Martin No. 2 extension and enlargement, from Laramie River, west side, page 40, seven entries of water diverted during the season. Nellie Ditch from McGuire Creek, page 43, nine entries of water diverted during the season. Ollie Ditch from Jimmy Creek, page 44, seven entries of water diverted during the season. Parker Ditch from Laramie River, page 46, six entries of water diverted from the Laramie River during the season. Stuck Creek Ditch from Stuck Creek, page 48, nine entries of water diverted during the irrigation season. Stuart No. 2 Ditch from McIntyre Creek, page 51, "no water diverted." Slough Ditch from Slough Creek, page 61, eight entries of water diverted. Trollope Ditch from Trollope Creek, five entries of (520) water diverted during the season, page 62. Timothy Ditch from Laramie River, page 64, ten entries of water diverted during the year.

Wright Ditch from Laramie River, page 68, seven entries of water diverted during the year.

On page 89:

"The information given here was obtained through careful observations and by consulting the various landowners or foremen of ranches. I obtained from the water users first and last day water was used. Reports of the average daily amount of water run are from conservative estimates and measurements on the different ditches. Crop reports are made from estimates as to the yield per acre given by ranch owners. Total number of acres irrigated in District 48 for the season 1932 about 7,000 acres. This is an estimate of meadow and pasture land. The survey of 1931 shows 4,250 acres of meadow land. This does not include lands on Sand Creek, estimated at 505 acres. Total number of acre feet of water run in Water District 48 for the [fol. 480] season 1932, 36,869.30 for meadows and pasture lands. Estimated tonnage of hay produced in 1932, approximately .85 of a ton average per acre, or about 3,870 tons native hay."

That report was sworn to on page 90 by R. A. Mosier, on the second day of December, 1932.

Mr. Howell: The defendant objects to the reception of that portion read into the record, as found on page 89 of the water commissioner's reports of District 48 for the years 1926 to 1932, inclusive, insofar as such comments and observations constitute hearsay evidence, and not within the water commissioner's own actual knowledge, and beyond the requirements of (521) his duties as water commissioner as provided by law; and, for the further reason that such statements or observations constitute mere conclusions of the water commissioner, without giving the names of the parties or the times or places or circumstances under which they were consulted. We object for the further reason that such testimony has weight only when the circumstances under which the observations were made can be explained by oral evidence of the party making the observation.

My statements of observations in these field books, covering the years 1926 to 1932, inclusive, under the terms "observations" or "entries", are what the books disclose

as to the number of times the water commissioner was at the particular point of diversion, or inspecting the ditch diverting water from the Laramie River, in an official manner in connection with his administration.

As to whether or not, from my engineering judgment and knowledge of the proper practices of irrigation, the records which I have examined indicate a proper supervision and administration of those irrigation works during the irrigating season, where the diverting ditch from the Laramie River on the Colorado Meadows is at an altitude of ap- [fol. 481] proximately eight thousand feet or more and the diurnal fluctuation is pronounced during the irrigating season, as indicated by the frequent references to the various field books, observations by the water commissioner in no instance, as I recall, exceeded ten visits per year and frequently fell as low as two or three visits. For this reason, the (522) accurate determination of the amount of water diverted is not reflected in the records of the water commissioner, because of his infrequent visits.

Complainant's Exhibit No. 3, previously introduced in this hearing, contains the yearly diversions from the Laramie River and tributaries for the irrigation of the Meadow Lands in Colorado in District 48 for the year 1926, as reprted by the water commissioners for the various ditches in District 48. As to where I find that information on this exhibit, the first column gives the name of the ditch; the second column, the name of the owner; the third column, the numbers of priorities; the fourth column, the amount of appropriation in cubic feet per second; the fifth column is headed "capacity of canal"; the sixth column, the length of main ditch in miles; the seventh column is headed "length of laterals in miles"; the eighth column is headed "first day water used from the natural stream"; the ninth column "last day water used from natural stream"; the tenth column, the number of days water carried from natural stream; the eleventh column is headed "average daily amount of water during season cubic feet per second from natural stream"; the twelfth column gives the number of acre feet used by canal for season from natural stream; and the thirteenth column gives the total number of acres that can be irrigated.

In addition, under the caption of "crops irrigated from canals, in acres", columns fourteen to twenty-five give the subdivisions in the various kinds of crops. Columns

twenty-six to twenty-eight give the cost in dollars, and column twenty-nine is headed "remarks, source (523) of information, and so forth".

[fol. 482] I found there the total amount of diversions on these Meadow Lands in the year 1926. In column twelve, it is headed "number of acre feet used by canal for season from natural stream". Inasmuch as there are three sheets tabulating the various ditch diversions, I have taken the totals from Sheet 1, of 23,378.8 acre feet, from Sheet 2 of 26,324.0 acre feet, and from Sheet 3 of 13,084.8 acre feet. Summing those, a total diversion is 62,787.6 acre feet. That is what this exhibit discloses as to the number of acre feet of water diverted from the Laramie River and tributaries for the irrigation of Meadow Lands in Colorado for the year 1926, including the meadows on Sand Creek irrigated by Sand Creek ditches.

In column twenty-nine on the second page of this exhibit, I find a statement as to the number of acres of land irrigated for that (524) year—8,311 acres. As to whether this exhibit discloses the number of acre feet of water diverted from the Laramie River to the Cache la Poudre River Tunnel, referring to Item 10 on the second sheet of the water commissioner's report, Laramie River Tunnel, I find the following: "Diverted from March 1st to October 1st, 590,120,320 cubic feet for direct irrigation in District 3." Converting that quantity into acre feet, gives 13,572 acre feet.

(525) (Complainant's Exhibit No. 73 marked for identification.)

(Certified copy of water commissioner's ditch report for the irrigation season of 1927 for Water District 48.)

(526) Referring to the Laramie River in Complainant's Exhibit No. 73, which is a certified copy of the water commissioner's ditch report for the irrigation season of 1927 for Water District 48, consisting of a certificate and two photostatic pages, I find the following: "Amount of water diverted through tunnel from April 8th to September 10th, 1927, equals 260,729,280 cubic feet." Converting the quantity in cubic feet to acre feet, I get 5,996 acre feet as [fol. 483] diverted by the Laramie-Poudre Tunnel in 1927. The "Laramie-Poudre Tunnel" is the same as what we call the "Greeley-Poudre Tunnel" or the "Laramie River Tunnel".

Referring to the quantity of water diverted for the Colorado Meadows in District 48, there are no totals on the sheets and it would take an adding machine to run them up—it would take a matter of fifteen minutes or so. I find in column 29, under the title "remarks", the statement, "total number of acres irrigated 1927, are about 8,076."

Mr. Greenwood: I think I might agree with you, with (527) reference to this exhibit and the other two following exhibits, that these might be added up later?

Mr. Howell: Yes.

Mr. Greenwood: With that stipulation with reference to showing the total, Complainant now offers in evidence its exhibit No. 73 and asks that it be received as evidence in the record. We are offering the entire exhibit for the purpose of showing the amount of diversions from these two sources, from the Meadows and the Greeley-Poudre Tunnel.

(Complainant's Exhibit No. 74 marked for identification.)

(Certified copy of water commissioner's ditch report for the irrigation season of 1928 for Water District 48.)

(528) Taking Complainant's Exhibit 74, which is a certified copy of the water commissioner's ditch report in the office of the State Engineer of Colorado for the irrigation season of 1928, for Water District 48, and referring to the Laramie-Poudre Tunnel, herein shown as the Laramie River Tunnel, there is no entry as to the amount of water diverted from the Laramie River to the Poudre Basin in the year 1928. Referring to the number of acre feet used by the canals for the season, as tabulated in column 12, I am unable to give the total without putting the table through the adding machine. I mean by the "canals", the Meadow diversions.

Column 29 of that exhibit discloses the following state-[fol. 484] ment as to the number of acres irrigated in the Meadows in Colorado in the year 1928: "Total number of acres irrigated in District 48 for this season, 8,266 acres."

Mr. Greenwood: Subject to a compilation of the total diversions for the Meadows to be ascertained and put into the record later, Complainant now offers its Exhibit No. 74 and asks that it be received as evidence in the record.

(Complainant's Exhibit No. 75 marked for identification.)

(Certified copy of water commissioner's ditch report for the irrigation season of 1929 for Water District 48.)

(529) Taking Exhibit 75, which is a certified copy of the water commissioner's ditch report of District 48 for the irrigation season of 1929, I find there is no entry of water diverted by the Laramie-Poudre Tunnel from the Laramie River to the Poudre River in the year 1929. Referring to the column 12, I find there are no totals on the amount of water diverted by the Meadow ditches in Colorado, and these tables will have to be put through the adding machine.

Mr. Greenwood: Subject to the further statement with reference to ascertaining the total amount of water diverted from the Meadows, Complainant now offers its Exhibit 75 and asks that it be received as evidence in the record.

On page 21 of water commissioner's field book for District 48, State of Colorado, for the year 1926, under the title of "Grant's Ditch, from Roaring Creek, tributary to McIntyre," I find the statement, written in longhand, "this ditch is under construction by Marie J. Mosier, Jelm, Wyoming." That name applies to the various ditches as the owner— (530) wherever the name is given here, it applies to the owner. I do not know whether Marie J. Mosier is any relation of R. A. Mosier.

Referring to water commissioner's field book, District 48, State of Colorado, for the year 1927, on page 69, I find [fol. 485] inserted there in longhand: "Grant's Ditch, located on Section 7, Township 10, Range 76, under construction, Marie J. Mosier, Jelm, Wyoming."

On page 19 of water commissioner's field book for District 48, in the State of Colorado, for the year 1928, is the following written in longhand: "Grant's Ditch, Roaring Creek, Ditch under construction, Marie J. Mosier, Jelm, Wyoming." And on page 19, water commissioner's field book, District 48 of Colorado, for the year 1929, is the following in longhand: "Grant's Ditch, Roaring Creek, under construction, Marie J. Mosier, Jelm, Wyoming; $100.00 on construction work for 1929."

At page 19, water commissioner's field book, District 48, for the State of Colorado for the year 1930, there is

written in longhand: "Grant's Ditch, Roaring Creek, under construction, Marie J. Mosier, Jelm, Wyoming."

Mr. Greenwood: It is agreed by counsel representing the Complainant and counsel representing the defendant, that the testimony given by Mr. Meeker with reference to the contents of water commissioner's field books of the State of Colorado, (531) District 48, for the years 1926 to 1932, inclusive, including the quotations therefrom, may stand in the record as a correct statement of what those books disclose, and is offered in lieu of the original statements found in the records, and for the purpose of relieving the necessity of including the original records in the record in this case.

Mr. Howell: As to the ditches named therein?

Mr. Greenwood: As to the statements made by the witness; nothing except what he stated and quoted.

Mr. Howell: And subject to any other objection which counsel have made or may make?

Mr. Greenwood: Yes.

Mr. Kelly: That is, in lieu of offering the writing itself, it is agreed that this evidence is excerpts of what is [fol. 486] found in the record, which are voluminous books?

Mr. Greenwood: Yes. The excerpts and statements by Mr. Meeker, taken from these records, will be accepted without objection, except as to its not being the best evidence, of what is found in the writing; in other words, in lieu of the writing itself.

Mr. Howell: That is all right.

(Complainant's Exhibit No. 76 marked for identification.)

(Photostatic copy of page 59, commencing with the words, "diurnal fluctuation," to page 65, ending with the words, "unit run-off," of a document entitled, "Department of the Interior, United States Geological Survey, Contributions to the Hydrology of the United States for the year 1921," Water Supply Paper 500.)

(532) Mr. Greenwood: Complainant offers in evidence pages commencing on 59, with the words "diurnal fluctuation," to the end of the first paragraph on page 65, ending with the words "unit run-off," of a document entitled De-

partment of the Interior, United States Geological Survey, Contribution to the Hydrology of the United States, for the year 1921, by Nathan C. Grover, chief hydraulic engineer in the United States Federal Government, and asks that the same be received as evidence in the record in this case as Complainant's Exhibit No. 76. The subject of the information offered is the statement with reference to diurnal fluctuation at high altitudes in the Rocky Mountain region, from 8,000 to 14,000 feet. We ask leave to substitute, in lieu of this original document taken from the Wyoming State Library, photostatic copies of these pages. The subject contained in the pages offered is prepared and submitted for this publication by Robert Follansbee. The further identification of this is, Water Supply Paper 500.

[fol. 487] (Complainant's Exhibit No. 77 marked for identification.)

(Topographic map of the United States Geological Survey, Home Quadrangle, Edition of 1920.)

(533) Complainant's Exhibit No. 77 is a topographic map of the United States Geological Survey, Home Quadrangle, Edition of 1920, and portrays the relief and the drainage of the headwaters of the Laramie River and the adjacent territory. The contour interval is one hundred feet, and the scale is one in 125/1000ths; that scale is approximately two miles to the inch.

This exhibit is a topographical picture of the area embracing the drainage basin of the Laramie River at the streams involved in this lawsuit, including the diversions from the Laramie to the Poudre and through Chambers Lake. I should state that all of the Laramie River Basin is not shown on this map, because the map quadrangles cover an interval of one-half degree longitude and one-half degree latitude, and a portion of the drainage of the Laramie Basin is not on the map.

Rawah Creek enters the Laramie River from the west at a point approximately six miles down stream from the Greeley-Poudre Tunnel west portal. The west branch of the Laramie River enters the main Laramie River several hundred feet above the headworks of the inlet canal of the Greeley-Poudre Tunnel, so that Rawah Creek enters the river (534) approximately six miles below the west branch of the Laramie River.

(Complainant's Exhibit No. 77 offered in evidence.)

I am familiar with what is known as the West Side Collection Ditch, or the Lower Rawah Ditch. I first became acquainted with it in May, 1913. At that time, I made an inspection of the territory where that ditch is now constructed and traversed the line of the ditch. My object in traversing this ditch line was to know the status of construction on the ditch, and I made observations as to how far it was constructed and what progress had been made [fol. 488] with construction. I made notes that the survey stakes were still along the side of the ditch, and, using those to define the locations of various sections, I made notes of the condition of the ditch at that time.

Referring to my notes as to the progress of construction at that time, there were considerable portions of the ditch that were not constructed. In some instances the right-of-way was cleared—in fact, I think the right-of-way was fairly well cleared. And then, there were sections of bench excavation, and sections of canal prism (535) excavated; but, generally, the ditch, I would say, was not over half constructed, perhaps not that much. The ditch is located on the slope of the Medicine Bow range, along the west side of the Laramie River. It is rough, mountain territory, considerable rock work.

I was familiar with the use to be made of that ditch as it was outlined for construction and a right-of-way staked, as of 1913 and 1914, when I visited it. I made a study of information in the field, and from other sources, and the object of the ditch was to convey water from Rawah Creek and intermediate tributaries to the Tunnel Reservoir, which was located immediately northwest of the portal of the Laramie-Poudre Tunnel, the dam being approximately two-thirds of a mile north of the portal. The reservoir dam had not been built, completed, but a small amount of work had been done on the fill, and the concrete outlet culvert had been constructed.

I visited the area recently and found that the reservoir was never completed and it has been abandoned, and, in lieu thereof, a new piece of construction not contemplated originally has been made, extending approximately three-quarters of a mile from the ditch as originally constructed, around the side of the mountain to the west portal of the tunnel, to the headworks of the west portal. The new

(536) construction is at the end of the ditch where it approaches the tunnel. The stationing on the ditch commenced at the dam, or very close to the dam, of the reser- [fol. 489] voir, and ascended up the ditch to Rawah Creek, Station 1 being located opposite the tunnel damsite. That was the end of the ditch in 1913.

A new ditch, not contemplated originally, has been built extending up the Laramie River, but on a descending grade, to the headworks of the tunnel inlet canal. It follows the side of the mountain on grade contour where it has been constructed, and crosses the valley of the Laramie River a short distance above the Laramie-Poudre Tunnel.

The completion of this reservoir project for the purpose of storing water gathered from these various streams, would have submerged the present location of the Rawah Ditch which is constructed across the valley. As to whether it would be impossible to use the reservoir as contemplated as a storage basin and at the same time convey this Rawah Creek water through that ditch independent of that reservoir and into the tunnel, there would be no object in building the ditch if the dam had been completed and the reservoir storage capacity developed.

(537) Mr. Kelly: We object to that as not responsive to the question.

The portion of the ditch, commencing at the point where it contacts with the Laramie River some three hundred feet above the intake of the tunnel and extending across the valley to the mountain side, does not lay in such a location that it could function and carry water to the tunnel if this reservoir had been constructed and was in operation. In other words, the operation of the ditch could not be independent of the reservoir if the reservoir was there and completed.

In connection with my study of that ditch and the vicinity where it is constructed, during my visit in 1913, I made some photographs of the condition of the course where the ditch was to be constructed—where it was staked out, commencing at the end of the ditch at the point opposite the reservoir damsite, and at other points. I have such photographs here.

[fol. 490] (538) (Complainant's Exhibit No. 78 marked for identification.)

(Two photographs of the West Side Collection Ditch taken in 1913 at a point approximately opposite the tunnel damsite.)

(539) Complainant's Exhibit No. 78, consisting of two photographs with notations in connection with them, are pictures that I took on my visit there in 1913 of the location of the West Side Collection Ditch, or the Rawah Creek Ditch. Both pictures on Exhibit 78 are near the end of the West Side Collection, or Lower Rawah Ditch, at a point approximately opposite the tunnel damsite. The upper picture on the exhibit shows the West Collection Canal at Station 1; the lower picture shows the West Side Collection Canal looking up the canal—that is, down the Laramie Valley—from about Station 3. The station numbers on this ditch run toward Rawah Creek, the point of origin being in the vicinity of the tunnel reservoir damsite.

Those photographs disclose the condition of construction at those points at the time I was there and took the pictures in 1913.

(Complainant's Exhibit No. 79 marked for identification.)

(Two photographs of the West Side Collection Ditch taken a considerable distance below the tunnel reservoir damsite.)

(540) Complainant's Exhibit No. 79 contains two photographs on the West Side Collection Canal, showing sections in excavation, and sections where only right-of-way were cleared, the excavation not being continuous. Both of these pictures were taken a considerable distance below the tunnel reservoir damsite and their location is partially evidenced by the height of the grade excavation line of the ditch above the valley floor.

In the upper photograph in Exhibit 79, that more or less vague streak, partially white, following along the tree tops, is the outline of the right-of-way; and the lower one indicates a small portion where there has been some breaking of the right-of-way and discloses further that nothing has [fol. 491] been done beyond that in that area.

(Complainant's Exhibit No. 80 marked for identification.)

(Two photographs taken at the tunnel reservoir damsite, located approximately one-half mile below the headworks of the inlet canal for the Laramie-Poudre Tunnel.)

(541) Complainant's Exhibit No. 80 consists of two photographs at the tunnel reservoir damsite, located approximately one-half mile below the headworks of the inlet canal for the Laramie-Poudre Tunnel. The upper photograph shows the cross section of the damsite, having been taken from one side of the valley at right angles to the course of the Laramie River, showing the damsite clearing and a small amount of construction work. The lower picture shows the concrete outlet conduit to the unfinished dam of the Laramie tunnel reservoir.

With reference fo the lower picture, as to whether I have examined, subsequent to the time of taking that photograph, to learn whether anything has been done other than appears in that picture with reference to the construction of the reservoir, I have since observed it, recently, and the construction has never been completed, very little construction work having been done on the dam. These concrete collars around the conduits are still in existence in the valley.

I have observed as to whether anything further was done toward the construction of this dam than appears in the upper photograph of Exhibit No. 80, toward the construction of the reservoir, and as far as I could observe, no further work had been done. My last observation was in September of 1932.

The work of construction had ceased at the time I in-
(542) spected this right-of-way in 1913; there was no construction under way. I am not positive as to whether anything further was done with reference to construction between the time of my visit in 1913 and 1929. I cannot state from my own knowledge, when, by the use of this ditch as [fol. 492] now constructed, water was first diverted through it from Rawah Creek and other tributaries into the Laramie-Poudre Tunnel. As to whether water was conveyed through the ditch as now constructed and into the Laramie-Poudre Tunnel prior to the year 1929, I saw no water diverted; no water could be diverted to the Laramie-Poudre Tunnel without the construction of three-quarters of a mile of new ditch. The remainder of the ditch, in addition to the new construction of three-quarters of a mile to connect with the tunnel, was not in such a condition as to convey water, or in other words, was not a completed ditch, at the time I last saw it.

The tributaries of the Laramie River that are intercepted by the West Side Collection Ditch as now constructed, between the point where it taps Rawah Creek and where it delivers its water to the Laramie River above the tunnel intake, are Springer Creek, the first creek down the ditch from Rawah Creek; then Rapid Creek; then Fall Creek, and then Mill Creek, which enters the Laramie River approximately (543) one-half mile below the old tunnel reservoir damsite.

(Complainant's Exhibits Nos. 78, 79 and 80 offered in evidence.)

From my knowledge of the Laramie River watershed and the tributaries of that river, the diversion of water, for instance, from Bob Creek, Columbine Creek, or Deadman Creek, or what is known as the Lost Lakes, natural tributaries of the Laramie, by artificial means to the Cache la Poudre watershed, will decrease the river flow and decrease the amount available to Wyoming in proportion to the volume so diverted.

(Complainant's Exhibit No. 81 marked for identification.)

(Certified copy of the referee's report relating to the Laramie River system of the Greeley-Poudre Irrigation District, Ditch No. 76, on file in the records of the District Court of Larimer County, Colorado, in Case No. 2725, In the Matter of the Adjudication of priorities of water rights [fol. 493] in District 48, State of Colorado, for irrigation and other uses.)

(544) Mr. Greenwood: Complainant offers in evidence its Exhibit No. 81, which is a certified copy of the records of the District Court of Larimer County, Colorado, being certified as a full, true and complete copy of that Court of the report of the referee relating to the Laramie River system of the Greeley-Poudre Irrigation District, Ditch No. 76, the Laramie River Tunnel on the Laramie River system, filed on the 14th day of February, 1914, in Case 2725, entitled "In the matter of the adjudication of priorities of water rights in District No. 48, State of Colorado, for irrigation and other uses." The exhibit is a true copy of the record as it appears on file in that office. This consists of the finding of the referee and the recommended decree by the referee, before whom the proof of appropriation was

submitted, and pertains to the Laramie River system of the Greeley-Poudre Irrigation District, and the decree on Ditch 76 of the Laramie River Tunnel of the Laramie River system under Ditch Priority No. 75. We ask that it be received as evidence in the record.

(Complainant's Exhibit No. 82 marked for identification.)

(Certified copy of the testimony of Abraham I. Akin in the matter of the adjudication of the claim of the Greeley-Poudre Irrigation District, on file in the records of the District Court of Larimer County, Colorado, in Case No. 2725, In the Matter of the Adjudication of priorities of water rights in District 48, State of Colorado.)

(545) Mr. Greenwood: The Complainant now offers its Exhibit No. 82, which consists of a certified copy of the District Court record in Larimer County, Colorado, and is a true, full and correct copy of the testimony of Abraham I. Akin, in the matter of the adjudication of the claim of the Greeley-[fol. 494] Poudre Irrigation District for the Link Lake Reservoir No. 1, and a part of the decree relating to reservoir Link Lake No. 1 of the Laramie River System, and that part of the decree relating to No. 76, the Laramie River Tunnel of the Laramie River System, said decree having been signed on February 20th, 1914, by Judge Neil F. Graham and L. R. Temple, being the referee, all in Case No. 2725, entitled, "In the matter of adjudication of priorities of water rights, irrigation district No. 48, of the State of Colorado, for irrigation and other beneficial uses," certified as of April 17th, 1931. We ask that it be admitted into the record.

I will state that Exhibit No. 82 is offered for the purpose of showing the source from which the Greeley-Poudre Tunnel appropriation is entitled to divert its water from the Laramie River through the tunnel into the Cache la Poudre River.

Mr. Howell: We object on the ground that it is incomplete, inasmuch as it shows on its face that it refers to other instruments which are necessary to completely show the matters referred to, it being shown to be only a part of an inter-related system. The same objection is made as to Exhibit 81, inasmuch as reference is made to other papers and other testimony, and they should all be offered together.

Mr. Greenwood: I will state that Exhibit No. 81 is offered for the same purpose as is Exhibit 82, inasmuch as objection is made to that.

(Complainant's Exhibit No. 83 marked for identification.)
(Certified statement of decrees awarded certain ditches and reservoirs named therein as evidenced by certified copies of decrees on file in the State Engineer's office of Colorado.)

[fols. 495-497] Complainant's Exhibit No. 83 omitted. Printed side page 2604 post.

[fol. 498] (546) Mr. Greenwood: Complainant now offers its Exhibit No. 83, which is a certified copy of decrees of water rights, with the certificate of M. C. Hinderlider, State Engineer, by deputy C. C. Hezmalhalch. It is offered, so far as it pertains to the Skyline or Laramie River Ditch, District 48, showing the decree of August 7th, 1891, for 18,000 acre feet per year to the Laramie River Tunnel, and August 25th, 1902, for 15,500 acre feet per year additional. As to the Lower Supply Ditch, decreed as Rawah and Lower Supply, additional as of the date of August 25th, 1902, for 275 cubic feet per second. We ask that it be received as evidence in the record.

Mr. Howell: The defendant objects to the introduction of Complainant's Exhibit 83, for the reason that the paper purports to refer to certain decrees of the Court, and this exhibit is not the best evidence. Furthermore, the paper shows on its face as to the item in line 3, on the second page thereof, that there is used the term "acre feet per year," which was not at the time of the certification and is not now recognized as a measure in decrees of this character under the laws of the State of Colorado. We also make the same objection as to the item occurring in line 5, page 2. Furthermore, it could not be binding in any respect upon this defendant, the State of Colorado, for the reason that this defendant was not a party to any of the litigation referred to in the Exhibit 83, and as to the State of Colorado, this defendant, any such purported decree would be in the nature of ex parte proceedings. It is obvious that the exhibit, particularly as to the items heretofore mentioned, is not correct, and does not speak the truth; that the best evidence of any decrees rendered by the Courts of Colorado referring to water rights are the decrees themselves of the District

Court wherein rendered. The exhibit, (547) further, is wholly incompetent, irrelevant and immaterial, and does [fol. 499] not tend to prove or disprove any issue in this case.

(Complainant's Exhibit No. 84 marked for identification.)

(Copy of Claim No. 73, on behalf of the Rawah and Lower Supply Ditch of the Laramie River System, for adjudication of priorities of water rights as filed in the District Court of Larimer County, Colorado, in Case No. 2725, entitled, "In the matter of the adjudication of priorities of water rights in irrigation District No. 48, of the State of Colorado, for irrigation and other beneficial uses.")

(548) Mr. Greenwood: Complainant now offers in evidence its Exhibit 84, which is a claim No. 73, on behalf of the Rawah and Lower Supply Ditch of the Laramie River System, a certified copy of findings and decree entered in the District Court in Case 2725, entitled "in the matter of the adjudication of priorities of water rights in Irrigation District No. 48, of the State of Colorado, for irrigation and other beneficial uses." The decree is signed by Judge Neil F. Graham, referee L. R. Temple, dated February 20th, 1914. This exhibit describes the location of this ditch and its purpose, and the streams from which it proposes to convey water to the reservoir, the diversion works of the Laramie-Poudre System used to collect and divert water through the Laramie-Poudre Tunnel, and showing the location of the ditch, or describing the location of the ditch, with reference to the possibility of diversion through the Laramie-Poudre Tunnel. We ask that the same be received in the record as evidence.

Mr. Kelly: We make the same objection to this exhibit as to the other exhibit, as to other papers, and so forth, not offered.

Mr. Greenwood: I want it understood that Mr. Meeker's testimony is not closed until he has a chance to testify to these four additional items, Mr. Hinderlider is to bring up. [fol. 500] Let the record show that as to Complainant's Exhibits Nos. 73, 74 and 75, a subsequent statement will be made by Mr. Meeker showing the quantities of water diverted for the irrigation of the Meadows when he has computed that quantity taken from the three exhibits mentioned.

(Complainant's Exhibit No. 85 marked for identification.)
(Certified copy of certificates of appropriation which have been issued in the State of Wyoming pertaining to Sand Creek and its tributaries.)

Mr. Jackson: Complainant offers in evidence, Exhibit 85, being a certified copy by the ex-officio secretary of the (549) State Board of Control of the State of Wyoming, of certificates of appropriation which have been issued pertaining to Sand Creek and its tributaries in the State of Wyoming.

Mr. Howell: The defendant, State of Colorado, objects to the introduction of Complainant's Exhibit No. 85, for the following reasons: First, because this defendant is not a party to any of the proceedings referred to in the exhibit, and could not be bound and is not bound by any decision made or referred to in this exhibit; second, for the reason that as far as this defendant is concerned, the proceedings to which the exhibit refers were wholly ex parte; third, for the reason that as to this defendant it is wholly incompetent, irrelevant and immaterial.

(550) As to my testimony on page 381 of the transcript to the effect that "the discharge I will leave blank for the time being, because I think there is a slight disagreement there; I will supply that later from the rating table." I am able to do that now. The discharge is 120 second feet for a gauge heighth of 3.5 feet, that being the maximum discharge for a day on June 4th, 1924, five p. m., and shows a fluctuation of 70 second feet for a day.

[fol. 501] As to my testimony on page 394 of the transcript that "The point I wish to bring out is that this unreported water of the Skyline Ditch is not lost to that system; it goes into the bank and is held for future use," as I use the word "bank", it is synonymous with "reservoir".

As to the question appearing on page 426 of the transcript (551) of testimony—"The Meeker measurement you refer to is the 15.56 second feet?", that is an error and should be changed to 15.35 second feet.

I wish to correct my testimony as shown on page 428 of the transcript where I testified as follows: "Did Mr. Drummond make a measurement? (A.) He did. (Q.) What was the result? (A.) His measurement disclosed 15.19 second feet. I was in error in my statement as to the 15.54 second

feet being my measurement—that is Mr. Drummond's measurement. The Meeker measurement was 15.82 second feet." I would like to state that the Meeker measurement at the inlet of the Laramie-Poudre Tunnel was 15.54 second feet, and the Meeker measurement at the outlet was 15.35 second feet, showing a loss of .19 of a second foot through the tunnel. The Drummond measurement was 15.82 second feet at the inlet, and 15.19 second feet at the outlet, a difference of 0.63 second feet.

I ascertained the amount of water diverted for the irrigation of meadows for the years 1927, 1928 and 1929, as shown by Complainant's Exhibits 73, 74 and 75. For the year 1927, the Colorado Meadow Ditches diverted 57,779.2 acre feet, as shown on the annual report of the water commissioner of District 48. The ditches on Sand Creek diverted 3,628.2 acre feet, leaving a residue used on the Laramie (552) River Meadows and tributaries of 54,155 acre feet in Colorado.

Referring to the year 1928, 60,364.4 acre feet were diverted by the Colorado ditches, of which 4,085.2 acre feet were used on Sand Creek meadows. The residue used on [fol. 502] the Laramie River meadows and tributaries is 56,279.2 acre feet in Colorado.

Referring to the year 1929, 61,741.8 acre feet were diverted by the Colorado ditches, of which 2,968 acre feet were used in Sand Creek meadows. The residue of 58,773.8 acre feet were used on the Laramie River meadows and tributaries in Colorado.

The water diverted on Sand Creek meadows for the years 1927, 1928 and 1929 was in Colorado, and the figures I have given as to diversions for those three years, was a computation of the diversions as they appeared on the Exhibits 73, 74 and 75 for the respective years.

Cross-examination.

By Mr. William R. Kelly:

As I testified, Rawah Creek joins the Laramie River from the west approximately six miles down the stream from the tunnel, and Mill and Rapid Creek, and some smaller tributaries, join the Laramie from the west between Rawah Creek and the tunnel. That vicinity is a (553) narrow valley along the Laramie and is comparatively flat

in that particular section. There are meadows and beaver ponds, and there are beaver ponds in that valley above the tunnel as you go up the east and west branches of the Laramie.

The slopes of the mountains bordering the Laramie Valley on the west are quite steep and rise several hundred feet above this valley floor from the tunnel down to Rawah, and the waters of Rawah and these other creeks rush down this sheep slope to the valley below. The lower West Side Collection Ditch is constructed above the valley floor on the mountainside on the west side of this valley from Rawah Creek to the tunnel. It intercepts and diverts and conveys to the tunnel the waters of these tributaries which, otherwise, would flow into the Laramie below the tunnel. The purpose of the West Side Collection Ditch was, and is to collect and convey those waters.

I do not believe that such canal could be used for any other purpose by the Colorado appropriators. It is the only canal (554) constructed along that mountainside [fol. 503] for such purpose. As to what difference a change of structures at the lower end would make as long as they accomplished the same result in regard to diverting the waters of these streams and carrying the waters to the tunnel, that might affect the filing, and the rights, and so forth. As a practical matter, in the diverting of water, it accomplishes the same purpose; and whether there were a pond or a reservoir across which the water would run to the tunnel, or whether it ran in an excavated conduit, it would not make any difference in the accomplishment of the purpose.

The original suit of Wyoming against Colorado was commenced in the year 1911, which was two years before my visit to the Collection Ditch on the west side in the summer of 1913. Testimony in the original case is to the effect that the commencement of that suit effectively destroyed the market for bonds and securities of what is known as the Greeley-Poudre, or Laramie-Poudre Tunnel system.

This West Side Collection Canal was approximately half finished in 1913, when I visited it. Those completed parts were (555) located at various points along the line of the canal—disconnected units. Some were completely finished, and some partly finished. As to whether they were done by different crews, I do not know as to that.

As to the completed canal being located substantially along the line of construction previous to 1913, I have not been over the full length of the completed canal; I would say that it probably is very close to the old line. I think the old line had been stripped and cleared of trees clear up to Rawah Creek, but I am a little hazy as to whether it was entirely cleared. I think that the present point of diversion from Rawah and the creeks intercepting it on the way to the tunnel, is practically the same as in 1913, but I have not checked that.

There is also another collection ditch on the west side of the Laramie which diverts the waters of the same tributaries higher up and carries it to the west branch of the [fol. 504] Laramie River above the tunnel so that, if diverted, it flows into the tunnel.

The decree of the United States Supreme Court awarded the amount of 15,500 acre feet, annual diversion, through the tunnel. (556) I presume that these two collection canals were part of that project, and were so noted upon the maps attached to and made a part of the bill of complaint and the answer in that original suit. I think I prepared a map as a part of my testimony in that suit, in May 1914, showing in various colors what I classified as three different portions of the Laramie-Poudre Tunnel system. I am hazy as to whether it was introduced; if the record shows that, of course it was.

As to my dividing, in that map, the Greeley-Poudre system into three parts, one being the Plains system out of the Poudre, another part being what is called the Upper Rawah Ditch, and another part being what I designated as the Collection system of canals and trans-mountain tunnels, I do not recall of introducing any map, or preparing any map, that dealt with the Plains system. If the record shows that I prepared a graph, as Exhibit U-3, in which I separated the correlated system into three portions, I probably did, but I do not recall of that.

Referring to what is page 4361 of the typewritten transcript, being on page 1285 of the printed abstract of that transcript, I think I stated, as to the Upper Rawah—"on this graph I have attempted to segregate the correlated system into three portions, the first two portions going to make up that part of the Greeley-Poudre (557) system, or work connected with the tunnel. The one in brown is known as the Link Lake or Upper Rawah Ditch, being a trans-

mountain canal, whereas the Laramie River system is indicated in green and is a collection system of canals and trans-mountain tunnels." I colored it in brown; I do not recall coloring the collection system of the canals and tunnels in green. At that time, I probably classified the Upper Rawah as one separate unit, the Plains or Cache la Poudre part [fol. 505] of it as another unit, and the collection system of canals and trans-mountain tunnel as a third unit.

The photographs introduced through me, Exhibit No. 78, are photos I took in the summer of 1913, along the West Side Ditch. There is a tunnel shown in the first photo, at the top of that sheet, as a part of the line of the West Side Collection Ditch. That tunnel is indicated as "Tunnel No. 1", as a rather black hole toward the top of (558) the excavation. That tunnel is one through which the West Side Collection Ditch now runs. I think there was another tunnel along that ditch at that time, and I presume the West Side Collection Ditch runs through it.

Referring to Exhibit 79, the picture at the top was taken from the west side of the valley floor, looking in an approximately southwest direction. The camera was probably a half mile from the line of the ditch shown there; the line of the ditch is visible, at that distance, as an obvious clearing and excavation. The photo at the bottom of that exhibit is taken looking northwest, or slightly down the valley, from the valley floor. In one portion of the picture, it shows substantial construction along the West Side Collection Ditch, and in the other portion, no construction is evident.

In the photo at the top of Exhibit No. 80, the camera was approximately two thousand feet from the West Side Collection Ditch when that was taken. That is the width of the valley at that point. That (559) photo was taken from up on the mountainside on the east side of the valley, just over the tree tops.

The Laramie-Poudre Tunnel is located several miles below the Skyline headgate on the West branch of the Laramie.

I have never been an officer, or connected with, what is known as the Laramie-Poudre enterprise, or Greeley-Poudre enterprise. It is obvious from the study of the filings, that the object of the West Side Collection Ditch was to bring water from Rawah and intervening creeks to the tun- [fol. 506] nel, and to divert it thereby into the Cache la Pou-

dre River. As to whether I have examined the different maps showing the line of the West Side Collection Ditch and its surveys, when I was testifying, I was referring to Exhibit No. 78, the lower picture in the exhibit, which has the following statement: "West Collecting Canal of Laramie-Poudre Tunnel, looking up canal from about Station 3", Station 3 being located approximately opposite the tunnel reservoir damsite.

As to whether I examined the map which was introduced in the original suit of Wyoming versus Colorado, which consisted of several sheets of the Laramie-Poudre Reservoir and Irrigation Company's system, (560) filed in the State Engineer's office of Colorado on January 8th, 1909, being the map of C. R. Hedke, as to whether that map showed Station 3 of the West Side Collection Ditch beginning at Rawah Creek, in the absence of a filing number, I desire to state that my original map shows filing No. 1722 for an inlet canal from the west branch of the Laramie River, around to the west portal of the Laramie-Poudre Tunnel, but none of the filing maps which I studied, and that included the history of the project, discloses any canal from the south end of the tunnel reservoir damsite around the west side of the valley to the Laramie-Poudre Tunnel. The filing No. 1722, filed October 6th, 1904 by H. L. Munroe, is designated, as I have it, "The Laramie tunnel ditches and reservoir". My tabulation shows filing 1722, to be the Laramie tunnel ditches and reservoir, of date October 6th, 1904, by H. L. Monroe.

In the trial of the original case, in which I testified in 1913 and 1914, I could not say offhand whether I testified from a map known as Exhibit "T", introduced by Wyoming as a map of tunnel or collection ditches, filed September 24th, 1906. I did if the record so shows; that has been a matter of twenty years. According to my (567) original record here, that did not show the West Side Collection Ditch extending entirely to the tunnel.

Since my employment in connection with this present [fol. 507] suit, I have taken current meter measurements of the tunnel diversions at two times, in July, I believe it was, 1929, and in April, 1932. Those are the two times concerning which I have already testified, when I made current meter measurements. I took a current meter measurement of the flow of the Laramie-Poudre Tunnel system on April 16th,

1933, at approximately eleven o'clock; I don't have that measurement with me. I think that day was partially cloudy; it was Easter Day, a nice day.

I will have to look it up to find what amount was flowing. I made a current meter measurement; I did not make more than one during that day. I have not made any other measurements in the winter time to ascertain during different hours of the day the amount of flow, either (562) through the tunnel, or the Skyline Ditch, or the Wilson Supply Ditch. I have not made measurements in the vicinity of those ditches during the winter months, from November to April, to ascertain the flows at different hours of the day from the streams themselves.

As to whether I have found, as a matter of general experience, that records of winter flows of streams of those high mountain altitudes or similar altitudes, tend to be grossly excessive, if you are referring to old-time stream flow records, when ice conditions prevailed under conditions of twenty or twenty-five years ago, I could say "yes"; if you are referring to high atlitude runoff, as to its occurrence during winter months, there are very few records of high altitudes during the winter months.

I have made such observations or investigations on other high altitude areas in Colorado during the winter months. I recall clearly on the Snake River, near Dillon, an elevation of about nine thousand. I think that is some seventy or eighty miles, perhaps a hundred, to the south from this area in question. Also in other (563) localities on the eastern slope, of the Central Colorado Power Company, on Boulder Creek and tributaries.

The sunlight of the day has very little effect upon the [fol. 508] melting snows at those altitudes during the winter months, because of the low temperatures. Occasionally there is an inversion of temperature at the high altitudes, but that is not a regular matter. It is a fact that sometimes, up on top of the continental divide, it may be twenty or thirty degrees higher in mid-winter than what it is in the agricultural valleys—an unusual condition for a short time, a matter of a day or two.

I did not take measurements with Mr. Drummond at the tunnel other than the two days I have mentioned. I did not testify that I was present when Mr. Drummond meas-

ured a discharge of 91 second feet at the tunnel. I think I was never present when such a discharge was measured through the tunnel. The two days I mentioned were July 11th, 1929, and April 16th, 1933.

I took my measurement on April 16th, 1933, in the Venturi (564) flume, at the cross-section of the staff gauge. That would not embrace a six foot width; it would be greater than that, because of the flaring sides of the flume. The staff gauge is not in the throat of the flume. With respect to the upper end of the throat of the flume, the staff gauge is located several feet above the throat, approximately one-third of the distance, I would say, of the approach channel to the throat. The staff gauge is located approximately at the same point as the automatic register, or the stillwell. As I recall, the staff gauge is at the stillwell. That is not true as to the measurements both of July 11th, 1929, and April 16th, 1933. On the measurement of July 11th, 1929, the staff gauge was on the left side of the flume, and the automatic house was farther up the approach channel to the flume than the present automatic gauge house. There was different gauges at the two times.

I stated that I was not certain that the inlet from the flume to the stillwell and the automatic register was clogged up on July 11th, 1929, for the reason that the debris was deposited in the channel to a depth of half a foot or more, [fol. 509] perhaps a foot at the point where the inlet pipe led to the stillwell. As to my words, "there is some (565) doubt as to whether the inlet to the automatic register was clogged," there would be, under that condition. I am not certain of that; I did not explore that. This "debris", as I characterize it, was sand, gravel and rock debris, up to, I would say, six inches in diameter, or four inches. As to its being impervious to water, it was packed pretty tight, with the sand in among the interstices of the gravel and heavier material, and as to whether water could penetrate it, from my long experience on inlets and stillwells of automatic gauges, I considered it very doubtful as to whether the inlet would be functioning. I did not ascertain whether or not it was functioning. As to whether obstructions in the Venturi flume would tend to reduce or increase the amount of water passing through such a flume, that would depend on the location of those deposits. If they were in

the throat of the flume, it would tend to retard the discharge.

The measurement I took on July 11th, 1929, was at a time when about 15 second feet of water was passing through. I would say the capacity of that flume is at least 200 second feet. The passing of (566) a relatively large quantity of water through that flume causes a larger velocity than for amounts, such as 15 second feet, and ordinarily, it is true that when the water is flowing in relatively large amounts, it tends to carry in suspension, gravel, sand and smaller character of rocks.

I believe I did not testify, as to the Venturi, that when the water was faster, it scoured out or cut out sand bars and rock and carried them through, but when it slows down, it tends to drop them and deposit them along the side of the outlet on the throat; I think I so testified with reference to the Sand Creek flume, a rectangular flume. Leaving out of the question the actual section of the flume itself, that is generally the situation as to the action of water in any channel. That is, it is generally true that the deposits of sand and gravel and smaller rock and debris is a thing en- [fol. 510] countered in slower and smaller volumes, rather than in the higher volumes of water; but let me make myself clear: On the arrangement of the Venturi flume, with the inlet channel making a right angle turn approximately 25 feet above the upper end of the Venturi, with a heavy grade of about five feet between the east portal of the tunnel and the Venturi, taken in conjunction with the rock debris that comes through the tunnel, the deposition varies with different flows of water, is non-uniform, and that at no two times (567) have I seen it the same. As a general rule, the higher volumes of water and the larger velocities tend to carry such debris on through, as I found on July 11th, 1929, there in front of the Venturi flume, if the flume is located in a straight section of the canal or channel; but there is a limitation here on account of the water being thrown to the right side of the flume, or the outer curve. The inner portion of the stream flow has a lesser velocity and rock debris lodges on the inner side of the curve. I think probably that could be true in swift water, in higher volumes of water, under the situation as obtains here.

Referring to photograph, Exhibit No. 57, introduced by me, it indicates that the thread of the stream was a very

small one at the time of the picture, just along the wall, at the right hand of the picture, as it approaches the Venturi flume. The rock debris in the picture is as great as four or five inches in diameter. It does not show the extent of the water as being clear across the throat of the Venturi flume. As I previously testified, the throat of the Venturi was only half clear; the right side of the flume was functioning, and the left half of the flume was not functioning. (568) When I was there on July 11th, I found a caretaker's house at the foot of the mountain at the east side of the tunnel. I did not see the caretaker; he was not around and I do not recall now if I made an effort to see him. As to whether I was ever refused access to the automatic register, there was no caretaker present on the April 16th, 1933, trip, and I made an effort to see the caretaker at that time. [fol. 511] I took the hinges off the automatic register box and ascertained what was shown by the automatic register at that time, on April 16th, 1933; but not on the former trip.

As to what I found was the velocity there at the flume on April 16th, 1933, I haven't my notes with me on that measurement; I have to look that up. My notes show what discharge I found at that time. I am not clear on that, but I think it was a matter of about three and one-half second feet. I have not been there since.

The variation I found on July 11th, 1929, in the discharge depth between six tenths of a foot and seven tenths of a foot, (569) which I said was the variance between the automatic register as I saw it and the report as given by the observer there, could have been due to this clogging of the throat of the Venturi flume. It may have been from the clogging of the inlet canal, or may have been from a disagreement between the pen record and the staff gauge. A portion of the throat of the flume itself was clogged.

It is a fact that the principle of the Venturi flume is that the throat does not clog with fine sediment, sand and gravel, and that the speed is accelerated as it comes over the throat of the flume; but, under the condition obtaining at the Venturi, with a right angle turn, the heavy discharge passes around the outer side of the right angle and material is deposited on the inner and left side of the flume. This deposit was in the approach channel, and clear down into the flume; and there was some debris in the throat of

the flume. As I previously testified, half of the flume was functioning; the other half was clogged with debris. I am referring to the approach channel and the (570) throat itself.

As to having access to records and measurements as to the Laramie-Poudre Tunnel, I think I have at all times had free access to ascertain whatever information I wanted from the Colorado authorities. I always make it a point, when I go out on a trans-mountain ditch, or other ditch, to [fol. 512] make myself acquainted with the caretaker the first thing, if he is there; and, as to the records of the State Engineer's office, I have had free access. I have made very copious copies from them, without interference.

I did not, on July 11th, 1929, made a determination to ascertain if the zero point of the staff gauge, which I stated I read at the time of my measurement, was located at the same elevation as the floor of the flume at the upper end of the throat section. The staff gauge was partly surrounded by debris, which was lodged in the approach channel at that point. The higher velocity of water through that flume would not keep the throat section free of accumulations under the conditions that obtain with a right angle turn. There is a large velocity, a high velocity, to the water as it comes out of that tunnel, but as it (571) comes around the curve, it is thrown to the right side of the flume and the debris is deposited in the sluggish inner side of the curve and works down the flume and lodges and is deposited there. It would be true that, with a normal amount of water coming through there, through the diversion season, there would be sufficient water to carry the full six foot width through the Venturi, if it were not for the debris that lodges in the approach channel and distorts the current. As to the location of these deposits with respect to the staff gauge rod of the flume, the entire approach channel had debris in it, and the throat of the flume. The staff gauge had debris probably over a half a foot in depth; in fact, as I recall it, it was near .65 of a foot deposited at the staff gauge. There was just a slight film of water passing over it. Yes, water tends to seek its own level.

I testified that Mr. Goyne Drummond, who was a witness here, also made a current meter measurement in the Venturi flume at the east portal of the Laramie-Poudre Tun-

nel, on July 11th, 1929. He used the same current meter that I used, but he did not use the same points of measurement which I used. He made his measurement, not in the [fol. 513] flume—the conditions were unfavorable for any measurement in the flume on (572) account of the rock debris. His measurement was made above the right angle turn in the expanded channel from the outlet tunnel. There was considerable—large amounts, of debris there.

I made my measurement up in the same section, but at a different point. I consider that I made an accurate determination of the amount of water going through there, selecting the best section for that. The conditions down in the Venturi were too adverse to even attempt a measurement.

Mr. Drummond and I varied in the determination we made of the amount of water flowing at the east portal by a small percentage. The difference was a matter of .16 of a second foot, which was between one and two per cent. As to the depth of water where I made my measurement, the section was nine feet in width, and the depths at the sides were from zero to one foot depth at the center of the channel, and fairly uniform from either side to the center of the channel.

Yes, you could make a meter measurement with a depth of zero on the side and with a maximum depth of .9. I divided the section up into one foot intervals and took depths and observations at the various points. I can give the velocities or discharges I found in each foot as I went across that section where I made my observations.

Section 0 to 1 foot interval, the mean velocity was 1.12 (573) feet, the depth ranged from zero to one-half foot, and the discharge for the one foot section was .28 of a second foot. Section 1 to 2 foot, the depth 0.5 to 0.7, the mean velocity was 2.70 feet, and the discharge 1.62 second feet. 2 to 3 foot interval, depth both sides, .7 of a foot, mean velocity 3.16 feet per second foot, discharge 2.21 second feet. Interval 3 to 4 foot, depth 0.7 and 0.85, mean velocity 3.18 feet per second, discharge 2.48 feet per second. Interval 4 to 5 foot, depth 0.85 to 1.00, mean velocity 3.12 feet per second, discharge 2.87 feet per second. Interval 5 to 6 feet, depth 1.00 to 1.05, mean velocity 3.09 [fol. 514] feet per second, discharge 3.15 feet per second.

Interval 6 to 7 feet, depth 1.05 to 0.80, mean velocity 2.20 feet per second, discharge 2.02 second feet. Interval 7 to 8 feet, depth 0.80 to 0.50, mean velocity 1.11 feet per second, discharge 0.72 second feet. Interval 8 to 9 feet, depth 0.50 and 0.0, mean velocity was 0.00, and discharge 0.00.

I used a small Price current meter that operates with a telephone system at the ear, and at the other end there goes into the water a device which consists of cups. I think the diameter of those cups is a matter of about four or five inches, and the thickness, approximately two and one-half inches.

(574) In a section from zero to one, I could determine the velocity of the water with that device by holding it in the middle of the section. Yes, you could turn it; they have a place in the center to keep it off the floor so the cups are not touching. As to whether I consider that an accurate determination of the amount of water flowing, that is the customary procedure, at the edge of the section.

I thought Mr. Drummond and I agreed on the discharge within one or two percent. It is quite true that a competent and experienced hydrographer, measuring at the same place with another competent man, and with the same instrument, find minor variations in what they calculate to be the discharge of a given stream. I think that variation might differ as much as five per cent at the same point with competent hydrographers. As to whether it depends upon the number of factors which are not perfected, and might be interpreted variably by different minds, there is the personal equation, of course. The sounding depths vary slightly by two men at different points, or the same points, and the velocities probably vary slightly at the same section. No, I do not think the interpretation of the velocities depending somewhat upon the interpretation through the ears by different men by this telephonic transmittal or collection of the turns of the wheel, is a factor. By personal equation I mean the judgment and experience [fol. 515] in (575) handling the meter and picking the cross-section to be measured, and factors of that kind.

As to my testimony that the measurement by me on July 11th, 1932, disclosed 4.72 second feet, which I stated was 70 per cent. of the actual flow as shown by the records of the State Engineer's office of the State of Colorado, the

variation was 30 per cent., the difference being minus 4.72 second feet unrecorded.

As to my testimony concerning the variation in velocities in the Venturi flume here, in connection with an analysis made of the measurements by the official employees of the State of Colorado which shows a wide variation of velocities from one side of the flume to the other, I think it might be the case that such velocities show they were measured some distance above the throat of the flume; but if the velocities were distorted above the throat, they would also be distorted within the throat.

It would be true that under the proper installation of the Venturi flume, if the approach channel is in a straight section, it operates so that the flow is adjusted across the throat of the flume by its very character of construction. Here, we have a right angle turn, which distorts the approach of the water and distorts the velocity. That right angle turn is twenty-five feet above the upper end of the (576) Venturi. The wooden side wall of the Venturi above the throat is sixteen feet long.

As to my testimony that some of the measurements in the Venturi flume at the east portal of the tunnel were grossly in error and were made by J. H. Bailey, I know J. H. Bailey personally. During the period covered by Wyoming's Exhibit No. 59, he held the official position of chief hydrographer with the State of Colorado. That exhibit shows the measurements made in the Venturi flume of the Laramie-Poudre Tunnel from the State Engineer's files. I believe Mr. Bailey is now assistant engineer under Mr. Follansbee, with the United States Geological Survey. His [fol. 516] duties under that position are both office and field—as assistant engineer for hydrographic work in the United States Geological Survey.

As to my testimony that I made a diligent search of the records of the State Engineer's office of Colorado concerning records of ratings of the measuring flume at the east portal of the Laramie-Poudre Tunnel, in which I referred to the testimony of the rating flume found to be at page 152 of Book 43 of the official rating tables of the State Engineer's office of Colorado, in an effort to prove that the (577) measuring flume in question, consisting at that time of a rectangular structure twelve feet in length, was wholly unsuited to the requirements to sufficiently and

accurately measure it, and referring to Pages 12 and 152 of Book 43 of the official rating tables of the State Engineer's office, I would say the measuring device described at Page 12 is one and the same structure as the one described on Page 152.

The record on page 12 discloses that this measuring flume was rated or calibrated on June 1st, 1918. It shows four meter measurements were made of that flume on June 1st; and later, one measurement by E. B. House, undated. The measurements as shown there on June 1st, 1918, were made by John Wortham. As I recall, John Wortham was deputy state engineer at that time; and E. B. House is professor of engineering at the (578) Agricultural College of Fort Collins—I do not know what position he held on the date of June 1st, 1918. I believe he is a recognized authority on hydrographic engineering.

I do not think the meter measurements as made by Mr. Wortham and Mr. House, as disclosed by the official rating table on Page 12 of Book 43, which I have here, show the same consistently, following almost a perfect line of sequence, between the gauge heighths of .63 and 1.10 feet so as to provide a satisfactory rating curve. As to your suggestion that I take time to plot a curve on that at this time, I will give you the answer in just a minute—my reply is, that it does not.

(579) Mr. Greenwood: At this time, the Complainant of- [fol. 517] fers three additional photostatic copies of field notes pertaining to the measurements made at the Venturi flume, which it was stipulated might be received as a part of Complainant's Exhibit No. 59.

Since recess I have made a further examination as to the official rating table on Page 12 of Book 43, to which I have just testified. I compared equivalent gauge heighths and discharges of the two rating tables, the 1918 rating table, and the 1920 rating table, of the Laramie-Poudre flume, east portal, and I find for a gauge heighth of 0.60 the 1918 table shows a discharge of 24 second feet, and for the 1920 table, a gauge heighth of 0.60 shows a discharge of 39 second feet, a difference of 15 second feet. Referring to a gauge heighth of 1.10 feet, for the 1918 rating table, I find a discharge of 70 second feet, and for (580) the same gauge heighth in the 1920 table, a discharge of 98 second feet, or a difference of 28 second feet.

Mr. Kelly: I move that the answer be stricken as not responsive to the question asked; evidently the witness did not understand the question. The question asked, to which reference was made, was as to whether you had examined as to whether the meter measurements disclosed by the official rating table on page 12 of Book 43, show that the measurements follow consistently and by an almost perfect line of sequence, between a gauge of 0.63 feet and 1.10 feet, so that a satisfactory rating curve or almost perfect rating curve was disclosed. Have you made a further examination to plot such a curve from these measurements of that rating table?

I only studied the rating curve as indicated in my previous answer. As to finding any notations or remarks noted by Wortham or House on these meter measurements shown on page 12 of Book 43, showing reference by them to any unsatisfactory condition concerning the rating flume, I found just two items—on page 12, at the left side of the page, is a sketch of the tunnel and the setting of the rating [fol. 518] flume, showing a right angle turn, which I previously testified is a very adverse condition and violates the first principle of the installation of a rating flume; and on page 12, in the rating table, "all ratings above 1.11 are projected upwards and are estimates.—J. B. W." The remarks of the hydrographer on line 8 from the top of the left hand page 12 are, "condition (581) when this rating was made—good."

As to not mentioning this rating of June 1st, 1918, as well as the rating of July 4th, 1920, covered by my testimony on my examination in chief, when both ratings occur in the same book of records, which I searched diligently, there was no effort made to exclude information on this table. I was familiar with it, and my notes show that this was the first official rating table on the Greeley-Poudre Tunnel, namely, 1918.

The record on page 102 of Book 47 of rating tables of canals and ditches of the State Engineer of Colorado consists of an official rating of the Greeley-Poudre Tunnel, June 25th, 1924, as made by W. J. McAnnely, hydrographer, who, at the present time, is water commissioner of District 3. He is not a deputy state engineer to my knowledge. On line 8, the record discloses the notation, "condition when this rating was made—fair. I did not fail to mention this

rating in my former testimony. I made no effort to name all of the rating tables of the Greely-Poudre Tunnel; I studied it and am familiar — it, but I did not mention it. (582) As to my testimony on my direct examination of an analysis of the automatic gauge heighth chart shows through the Laramie-Poudre Tunnel from May 1st to 5th, 1926, and the table I filed purporting to show the unreported diversions of the water through the tunnel on those dates, which I stated in my opinion amounted to 326 acres feet, in my computation: I used the rating table of Book 43, page 52, June 25th, 1924, rating by McAnnely.

Water commissioner's record of Water District 3 for the [fol. 519] week ending August 29th, 1931, for the record of diversion of water from Water District 48 into District 3, shows that water was reported for seven days for the Skyline Canal, and four days were charged to the (583) Laramie-Poudre Tunnel. Five second feet was the average shown diverted per day (as charged to the Laramie-Poudre Tunnel appropriation, and 14.5 for the Skyline appropriation. It was delivered to the Laramer County Canal. The computation shows that it was averaged over seven days for both diversions.

As to whether the water commissioner's record on file in the office of the State Engineer shows that the full amount of water turned into the Cache la Poudre River from the Laramie River was recorded for the week of August 29th, 1931, if that is the report I just referred to, the answer is "yes."

When I was a witness in the original case filed by Wyoming in 1911, on which my testimony was taken in 1913 and 1914, I testified (584) that I had been employed for some time in making investigations of the use of water, among other things, in the Laramie River Valley in Wyoming for the Laramie Water Company. I am familiar with the methods of irrigation of native hay meadows in the upper valley of the Little Laramie in Wyoming, and the general practice is to divert the water from the stream in sufficient quantities to cover the entire surface of the meadows there with a flowing sheet of water, and to maintain that flow throughout the season until haying time. After flowing across the meadows, the water flows back into the stream, from which it is successively diverted into various ditches below.

The Little Laramie Valley has a soil mantle of fine material, underlaid by gravel and coarse material. I believe the Big Laramie Valley in Colorado has much less of a soil mantle, and more of the gravel. While the diversions are large in the hay meadows in both those valleys, the consumption of water by such diversions for hay meadows is relatively small.

[fol. 520] (585) These ditches in the Laramie Valley in Colorado divert the water a matter of a quarter of a mile from the stream from which the water is diverted. The nature of the soil surface is not rather steep back into the river in the floor of the valley proper—that is fairly level. A large amount of the water returns to the stream. This same practice obtains in the North Park of Colorado, on the North Platte River, and is a situation that obtains generally in the high mountain valleys in Wyoming and Colorado.

In years past I made a study of the consumptive use of irrigation water on the Little Laramie in Wyoming, and in North Park on the North Platte in Colorado, to determine what the consumptive use ordinarily is in irrigation in those areas. I prepared this table entitled, "Consumptive use of irrigation water, comparative values, with related data, R. I. Meeker, March 20th, 1924."

Referring to Column 10, lines 1, 2 and 3, I found from that (586) study the consumptive use of irrigation water for the Little Laramie in Wyoming, one acre foot per acre per year. Another determination for the Little Laramie over a longer period, 0.90 acre foot per acre per year. No determination made from original data on North Park; a figure of 1.0 acre foot per acre per year assumed and adopted for the North Platte cooperative report of Conkling and Meeker. In this char., under "authoritative remarks", the designation "heavy flooded compact area" applies generally, but not entirely, to all of these areas of mountain native hay meadows.

Referring to page 12 of water commissioner's field book for District 48 in Colorado, for the year 1932, and reading from the left hand page, about the middle, after the notations of feet, the words so found are, "amount of water diverted through Laramie River Basin for 1932, reported from District 3." I do not find any other notation of pur-

ported reports of the amount of water diverted by the tunnel in this field book.

[fol. 521] (587) Referring to water commissioner's field book for Water District 48, State of Colorado, for the year 1929, at page 12, as to the diversions of the Laramie-Poudre Tunnel, I find a notation, after enumerating other diverting works in the Laramie River in Colorado, in the following words, "amount of water diverted through the Laramie River Tunnel from District 48 to District 3, reported from District 3, season of 1929, for direct irrigation in District 3 and lands under McGrew reservoir and storage." I do not find any other record of any diversion by the tunnel in that book.

As to water commissioner's field book for District 48, State of Colorado, for the year 1928, referring to page 12, following the matter of showing the number of feet of diversions by various ditches, the number of feet of diversions by the Laramie River Tunnel are not there shown. The number of feet of diversions there shown are under the headings, "priority and decree". The Laramie River Tunnel is included in that list of ditches, but it is only listed as to the number of ditch priority and is not listed as to the number of feet diverted. That page (588) shows that water in those columns have had written above them, in the first column, "priority", and below, and instead of what was printed there, is the "amount of river water in ditch"; and there is written in pen, under the column which had been printed as "amount of reservoir water in ditch", the word "decree", so that what was written in there refers to the priority and the amount of the decree, rather than to the amount of diversion.

The only notation in this book as to the amount diverted by the Laramie River Tunnel is that found about the middle of page 12, which reads, "Amount of water diverted through Laramie River Tunnel from April 10th to October 10th, reported from District 3, season of 1928, for direct irrigation in District 3 and lands under the McGrew reservoir, Laramie-Poudre Ditch Company, Greeley, Colorado."

[fol. 522] Referring again to page 12 of water commissioner's field book for District 48, for the year 1932, where the column for date is shown, the commissioner has written in pen the word "decree", and listed what purports to be

a statement of cubic feet per second under that. In the last column, which was originally entitled "amount of reservoir water in the ditch", he has written the word "priority" in ink, and (589) listed below that what purports to be priority numbers.

Referring again to water commissioner's field book for District 48, the water commissioner has written in ink, below the column entitled "amount of river water in ditch", the word "priority", and listed underneath that, purported priority numbers of the various ditches there; and in the next column, where it was printed to show the amount of reservoir water in ditches, he has written below that the word "decree" and inserted opposite the ditch name the figures purporting to be the amount of water decreed to that ditch.

All of these questions have related to water commissioner's field book of District 48 in Colorado and my answer have, likewise.

Page 12 of water commissioner's field book of District 48 in Colorado purports to show the number of cubic feet of water, or acre feet of water, or volume of water, diverted by the Laramie River Tunnel. As to my having already read that, I think that came from the annual report.

I did not state that the water commissioner had no facilities by way of rating weir or automatic register on the west side of the west portal of the tunnel in his water district, from which to (590) make accurate measurements; I made no such statement with reference to the west end of the tunnel. I did not state, with reference to the inlet canal of the Laramie-Poudre Tunnel, that the visits shown would indicate that his reports, made as to diversions, were not dependable. That does not show any visits made to the Laramie-Poudre Tunnel that year by the water commissioner. As to whether I would conclude that he had not [fol. 523] ascertained the amount he there states from any visits of his own, the book recorded no official visits.

By Exhibit No. 30, I show a comparisom of checks between thirteen current meter measurements by the State Engineer's office of Colorado of the recorded flows of the Venturi flume of the Laramie-Poudre Tunnell, and I checked that against the discharges shown by the Venturi table of discharges compiled and adopted by the State Engineer of Colorado. As to whether I computed the totals of the discharges as metered by the current meters in that table, I

only made the individual computations, no totals. In comparing the table shown on Exhibit 60, I took the chart gauge heighth, which is the gauge heighth of the recording (591) device, and entered that into the Venturi tables in order to secure the recorded discharge through the measuring device, and using the meter measurements as a base, determined the difference and the error in percents. I have made no totals; I testified to a previous question—no totals of all these measurements, if that is what you refer to.

I have not made the computation to ascertain whether, out of 323.6 total, the amount of water shown by the tests, against the Venturi table, the current meter tests showed a difference of only five feet less; I can make it, if you desire —it will not take long.

Yes, the two columns as summed, agree within five second feet. The total I get for the column of meter discharge is 318.68; the total for the column of Venturi table, 323.68, which makes a difference of just five feet. That is 1.5 per cent, calculated by the Venturi table as against the current meter measurement.

I do not consider that difference favorable to any one. Yes, under that sort of a summation, the Venturi table, and the method of calculation, showed more water coming through than the current meter tests demonstrated.

[fol. 524] (592) Redirect examination by Mr. James A. Greenwood:

The West Side Collection Ditch, as laid out and inspected by me in 1913, would require additional construction of approximately three-quarters of a mile of canal in order to convey the water to the Laramie-Poudre Tunnel from Rawah Creek and other tributaries along the line of the ditch.

With reference to appropriation of water to Colorado, each appropriation is assigned a separate priority number after adjudication. The purpose of that assignment of separate numbers is to distinguish it from other appropriations and keep them separate.

The field book for the year 1926, Water District 48, State (593) of Colorado, shows, at page 12, Rawah Ditch, Priority 71, decree 275 second feet; Lower Rawah Supply, Priority 72, decree 275 second feet. I find no priority whatever for the tunnel in that record.

The field book for the year 1927, which has been previously identified, on page 12, shows, as to assigned priority numbers, Rawah, Priority 71, decree 275 second feet; Lower Rawah Supply, Priority 72, decree 275 second feet; Laramie River Tunnel, Priority 75, no decree.

Mr. Kelly: When you state "no decree," there is no figure given?

The Witness: There is no figure given.

Mr. Kelly: It does not use the words "no decree"?

Mr. Greenwood: No, it does not.

The Witness: I can say "no entry".

The same record for the year 1928, referring to the same page shows, Rawah, Priority 71, 275; Lower Rawah Supply, Priority 72, 275; Laramie River Tunnel, Priority 75, no entry on the decree.

Referring to the field book of the water commissioner of Water District 48 for the year 1929, at page 12, Rawah Upper, Priority 71—275; Rawah Lower, Priority 72—275; Laramie River Tunnel, Priority 75—no entry on the decree. [fol. 525] For the year 1930, Rawah Upper, Priority 71—275; Rawah Lower, Priority 72—275; Laramie River Tunnel, Priority 75—no entry under the decree.

(594) For the year 1931, Rawah Upper, Priority 71—275; Rawah Lower, Priority 72—275; Laramie River Tunnel, Priority 75—no entry for the decree.

For the year 1932, Rawah Upper, Priority 71—275.0; Rawah Lower, Priority 72—275.0; Laramie River Tunnel, Priority 75—no entry for the decree.

The words "275" refer to the second feet in the decree. As I referred to each of these books, for the years 1926 to 1932, inclusive, under the term "Rawah Lower" or "Lower Supply," that is synonymous with what has been referred to in the testimony as the West Side Collection Ditch or the Rawah Collection Ditch.

Cross-examination.

By Mr. C. D. Todd:

I testified that I am familiar with the Wilson Supply or Sand Creek Ditch System. I made one inspection trip to the portion of the ditch from Deadman Creek to Sand Creek in July 1929. Referring to the lower unit of the Sand

Creek or Divide Ditch, I visited, examined and traversed it in 1913 or 1914, and again in July 1929. The Divide Ditch that goes from Sand Creek to Sheep Creek, plus Sand Creek up to (595) its junction with the Deadman Ditch, and then up the Deadman, and the extension above Deadman Creek, is all one system. It has been considered as such for a good many years.

The purpose of the Deadman Ditch and its extension is to collect and convey water from the headwaters of Deadman Creek to Sand Creek. It crosses several tributaries of Deadman Creek. The water collected by that ditch is conveyed to Sand Creek, and thence down the channel of Sand Creek approximately six or seven miles to the head works of the Sand Creek or Divide Ditch, and thence through a mile of canal to the Sheep Creek drainage, and the Cache la Poudre Basin.

[fol. 526] I am familiar with the measuring devices in that part of the system called the Divide Ditch. That is the sole measuring device to measure the water from the entire system, so far as I know; (596) it all goes over that measuring weir. The measuring device there consists of a concrete flume, an automatic gauge, and an enamelled staff gauge.

As to the length of the flume, I do not believe I measured it; I would say probably sixteen feet. As to the width, I will have to look that up and give it to you later; I have it. It is approximately two and one-half to three feet in depth; I do not recall the exact number of intervals on the enamelled gauge—probably three feet. It is a well constructed flume and set firmly and solidly in the ditch. I believe it is set on a direct line with the flow of the ditch. As to whether the measuring automatic devices in the flume are of standard make, the Bristol recording gauge is a standard make. If properly operated and attention given to it, the appliances are adequate and sufficient to measure the water that would pass through the flume.

I was there in 1913. The measuring device in the flume (597) at that time was not the one that is there now. As I recall, there was a wooden flume there then. The cement flume, I think, is approximately at the same location where the wooden flume was. I do not know of my own knowl-

edge when the present cement flume was put in; I think I have some information.

Water Commissioner McAnnely rated it in 1922, and I think that the change was made about that time. The removal of the old flume that was there in 1913, and the construction of the cement flume in 1921 or 1922, would require a new rating and a new table to accurately measure it. According to his statement, Mr. McAnnely measured or rated that flume on April 26th, 1922.

Mr. McAnnely is a competent hydrographer and able to do that kind of work accurately. He is now, and for some [fol. 527] years past has been the water commissioner in Water District 3, which comprises the (598) Poudre River and its tributaries. I think John L. Armstrong was the water commissioner in 1913 when I was there, but I am not positive.

Presumably, since 1922, any measurements or computations made on charts or meters, or otherwise, were made over the new cement flume. They could make measurements on other portions of the ditch on account of the shifting conditions of the flume, but the flume is the rating device for the ditch. It is probably the case that such measurements as have been taken and reported must have been made on that flume since 1922, but not always; sometimes ditches are rated above or below the flume if the conditions in the flume are adverse.

I was unable or failed to get information as to whether Mr. McAnnely rated the flume himself; I suppose it was in the flume. I have a copy of the McAnnely rating table, which I secured on April 26th, 1929, so that for some four years, I have had the official rating that he made of that flume.

(599) In the several computations to which I referred in my direct examination, as to computing the charts and the automatic devices in the State Engineer's office concerning this ditch and flume, in making my computations, I used the McAnnely official table of 1922. I have not used that in all of the computations that I have made; I drew some comparisons from the discharge measurements.

In my comparisons, I found a difference between the rating of that flume made by Mr. McAnnely and as shown by his statements, from the old table of 1912, and so testified. I did not compute the discharge over that flume from Sand Creek to Sheep Creek for the full year of 1932 by these

tables and charts—I think I did for intervals. I made no table of the daily flow for the full year—just at times, to compare with the discharge measurements.

I testified that when I was there on July 12th, 1929, I found 8.6 second feet running through the Divide Ditch, [fol. 528] with a gauge heighth of .69 feet. I did not figure the discharge at that time from a rating card, I measured it with a current meter which I had, independent (600) of any rating table. I made a comparison between the measurement made by Mr. Drummond, in which he found a gauge heighth to be 1.55 feet, and the discharge 43.76 second feet. In computing that discharge, I used the results of his current meter measurements, to which he testified in this case; I compared the discharge with the former rating table.

I stated that in my comparison, there was a discrepancy of 14.4 second feet, or practically 33⅓ per cent. If I had computed it on the McAnnely table, the amount would have been 58.2 second feet, and the difference would have been 14.4 second feet. I did not make the comparison of the 1912 rating table. When I gave my testimony, I gave the difference between the McAnnely rating table and the Drummond measurement.

On July 12th, 1929, when I measured the discharge in the Divide portion of this system, I also measured the water flowing in Deadman Ditch, and so testified. That was 3.51 second feet, and I gave a (601) percentage deduced from my figures that about forty per cent of the water flowing in the system that day came from Deadman Creek, and about sixty per cent was coming from Sand Creek.

It is true that at that time, those ditches were flowing a very small quantity; at that time of the year, the ordinary flow of those streams is a very small quantity. In May and June, they flow larger quantities. I would have to look up the records to give you a precise figure as to the maximum discharge of the whole system in any one day, but I would say offhand, probably 130 second feet, or 140. In the general runoff of any one year, it would begin with a lesser amount. In May, the flow would increase, and reach its culmination the latter part of May or the first of June, and then decline to the low July flows. Ordinarily the July flow would be the smaller amount of the three months. As com- [fol. 529] pared with the entire capacity of the system, the 8.6 feet which I found on July 12th, would be a very small part of the capacity of the ditch. At that time, the snow-

fall had pretty well (602) melted away on the whole system and the water in the ditch was largely ground water returned from springs, what we ordinarily call "seepage," and not from the heavy runoff of either rain or snow.

From my inspection of the records and knowledge of the locality, there is a wide difference in the amount of water that runs off from time to time and from day to day during about six weeks, when the water is available. There is a very substantial difference in the amount of runoff in a single day; that is your diurnal fluctuation.

I testified concerning the diurnal fluctuation when explaining Exhibit No. 40, and I gave the minimum flow as 50 feet and the maximum flow of the same twenty-four hours as 120 second feet, I believe, with a difference of 70 second feet. The diurnal fluctuation is liable to occur practically all of the time, until it got down to what we call the ground water or seepage water.

The measurements on which I based my estimate of 40 per cent Deadman water and 60 per cent Sand Creek proper water were made on (603) two different days. The Deadman Feeder measurement was made on July 10th, and the Sand Creek or Divide Ditch, on July 12th.

There would be some variation in that relation of forty and sixty per cent through the entire irrigation or diversion season under that system. It would depend upon the amount of water collected from the drainage area on Deadman basin as to whether the ditch took all of the water, as to the per cent during the snow runoff. Rain storms would sometimes make a difference for short periods during a day. I doubt whether there would be times when more water would be produced and collected by the Deadman system than would be in Sand Creek itself, for the reason that the Sand Creek drainage area is considerably larger than the area tapped by the Deadman Feeder. It would be an exceptional condition if certain storms fell on one and not on the other.

[fol. 530] In my direct testimony concerning the Divide flume, I spoke about some sand and detritus that would collect in front of the flume, which did not render it absolutely perfect. I referred to a blanket of sand and decomposed granite, which was probably four or five inches deep, in the rating flume for the entire width, which occurred by reason of wash and deposits from farther up the ditch lodging in

that (604) locality. If it was all cleaned to start with, I think these deposits would accumulate more or less during the season. If there was a large volume of water running, anywhere from fifty to one hundred forty feet, I think it would scour it to the floor of the flume and the flume would be clean. As the water diminishes, the current is not sufficiently strong to clear away all of the debris and detritus that comes down the ditch, and some lodges there. It is the assumption that when they are running a large quantity of water, it would all wash through; of course I did not see it under that condition.

The flume was placed in direct line with the flow of the water, which is the proper setting. The water commissioner of Water District 3, who was a hydraulic engineer, stated to me that he has tested that flume from time to time since its original rating by him to see whether it was working accurately. I do not believe that the flume has been kept in good shape so it would properly measure on the rating of 1922. If it was truly rated in the first instance, and was kept in (605) place, it would not continue to measure about the same; the measurements that Mr. Drummond and I made indicated that the rating table was off a considerable per cent in 1929.

I testified on my direct examination, concerning the measurements made by Goyne Drummond and the table that I have used in computing the same, as being the rating table of 1912. I find my former statement was in error. I can state what the rating would be on the McAnnely table—40.5 second feet. The difference between the Drummond and the McAnnely rating is about 3.4 second feet, which is [fol. 531] about eight per cent variation.

In my computations, I referred to that ratin, able of 1912, although the rating in Book 69, Page 40, made in 1912, has become obsolete by reason of the fact that there is a different flume, made in 1922, with a new rating, for the reason that the State Engineer's office worked up the daily discharges for 1931 and 1932 for the Sand Creek Ditch and used the rating table of 1912 to compute the daily discharges.

(606) That is not the actual amount of water that was diverted in the years 1931 and 1932. That was shown by the report of the water commissioner, according to his own table; but we also have the record of the State Engineer's office,

and in discussing which report would take precedence, Mr. Hezmalhalch told me that the blue prints prepared by the State Engineer would take precedence over the water commissioner's report.

Naturally, a superseded table would overcome a current table. As to the last table being the correct one, this is the latest computation of the State Engineer's office. It may be that it is not the last rating table by which this water was delivered from Sand Creek into Sheep Creek, but I was pointing out that there was two sets of official records. As to one perhaps being an error by having been superseded, by having been on an old flume that is not now in existence, if the water commissioner actually made his measurements of water delivered from Sand Creek to Sheep Creek on the new flume on the rating in 1922, that is the more nearly correct of the two; but as to that being the one that any one would prefer if he wanted an accurate statement, as I previously testified, the meter measurement by Drummond and myself showed the 1922 rating table to be obsolete. The table has not been changed; the same (607) figures are in the table as of date 1922.

The measurements I made were not a complete rating of the flume. As to their being just a measurement at one elevation, I had my measurements, Mr. Drummond's check measurement, and Mr. Drummond's measurement, of about 44 second feet, and some other data. My measurement and [fol. 532] Mr. Drummond's measurement, made the same day, do not tally exactly, but very closely, a matter of one or two per cent, as I recall. My measurements were in the nature of what we call "check measurements" rather than a complete rating.

Such measurements as have been made over the years, have been made by the water commissioner of District 3. Under the law, he is required to keep the record of foreign water, as we sometimes call it, that is brought into his district, whether it be reservoir water or ditch water. He is required to do that because he must likewise distribute the water, and therefore, he has to know what quantity comes in from those sources, and his distribution should tally with his intake, when allowance is made for losses in transit. (608) I found no record of any efforts having been made by the water commissioner of District 48 to make measurements on this system. The measurement by myself on the Sand Creek system was at a very low stage of water, but

Mr. Drummond had one at 44 second feet, and also had one of about 25 second feet on the Deadman Ditch, I think. Whichever it was, he found a considerable flow there. He made measurements more frequently than I did.

I did not make a computation on the diversion of Sand Creek to Sheep Creek based on Mr. McAnnely's reports made during the year 1932. In my investigation on the ditches and lands and streams of the Big Laramie River and its tributaries, I have studied the complete history of the Sand Creek Ditch, including its decrees and filings and related matters. I was over the ditch, as I previously testified.

As to whether or not the ditches mentioned in the decrees, that were introduced herein, have regular headgates with measuring devices so it can be accurately determined how much water is being demanded by those meadow ditches, I am slightly confused, Mr. Todd. Are you refer- (609) ring to the Laramie River meadows in Colorado?

Mr. Todd: The Sand Creek part of it, yes, is what I am referring to—the users in Sand Creek below the dam of the [fol. 533] Divide system.

I misunderstood you. I did not go over the meadows on Sand Creek, only those on the Laramie River in Colorado. As to the nature of the meadow land there being similar to the meadow lands in the valley of the Big Laramie, as to soil and the manner of irrigating, and things of that character, I think there is a general practice there in both areas. It is true that the system is to turn water into the ditches and let it run over the meadows, and keep it on for weeks at a time—the flooding system. Of that water that is turned on in that manner, there is a large return to the river. Without specific data, I would not care to offer a percentage as to the return over the surface and the return through seepage in the sand of the land adjacent to the river. Yes, it is large.

I think there is some difference between those lands and ditches along the north end of Sand Creek, and the ditches and meadows along the main river and its tributaries in Wyoming. They do not have (610) the water supply that the meadow lands have. I think the lay of the land, the small tracts, the small ditches, and things of that character, would be quite similar. I do not think the return water would be similar, because of the lack of water supply.

If there be a heavier return from these meadows and the water is used in No. 1 Ditch near the state line, as to whether that water would be available for No. 2, No. 3, No. 4, and so on, farther down Sand Creek in Wyoming, if that condition obtains, that is correct. Passing the water over or through the land would diminish it to the extent of the consumption by plant life and evaporation. For illustration, over ten miles there are ten ditches, the same water would be used, in some measure at least, over and over again as it passed down the stream, if the supply were adequate for a large area; but with a limited supply, perhaps only a portion of the ditches would receive water.

[fol. 534] Redirect examination.

By Mr. James A. Greenwood:

(611) In response to an inquiry from Mr. Todd, I believe my statement was that I measured the Deadman Ditch on July 10th, and the Sand Creek Ditch on July 12th; I did not measure them both on the same day.

I did not find any other than the 1912 rating table on file in the office of the State Engineer of Colorado. I made inquiry to know what official records there were, including rating tables applying to Sand Creek, from the State Engineer's office. I referred to the card index, rating table books, and drew on the assistants in the office; I made a request for whatever data was available in the State Engineer's office relating to measurements of stream flow diverted from Sand Creek by the Divide Ditch.

In response to my request, I was furnished with a daily rating record for the years 1931 and 1932, only, which is the blue print I have before me. Those daily ratings for 1931 and 1932 were made from the 1912 rating table prepared by Thomas Greve, Jr., to which I testified formerly—the one referred to by Mr. Todd as obsolete.

With reference to the irrigation of meadows, from my knowledge (612) as to the use of water, it requires more water to irrigate eight thousand acres of meadow lands in Colorado than to irrigate four thousand, two hundred fifty acres of meadow land. With relation to that, the difference would be quite material. As a matter of fact, the consumption would be double.

Recross-examination.

By Mr. C. D. Todd:

I do not know, of my own knowledge, the extent of the consumption of water in the ditches from Sand Creek. As to whether I know the amount of the area that was actually irrigated, Mr. Todd, I have not covered the Sand Creek area since 1913.

(613) I was a witness in the original suit between the State of Colorado and the State of Wyoming. John E. Field was the State Engineer of Colorado at that time, and also testi- [fol. 535] fied extensively in the case. I am familiar with Page 955 of the printed evidence, Volume 2 thereof, and Exhibit No. 124, introduced in evidence in that case as prepared by John E. Field, State Engineer of the State of Colorado. As to how much water was diverted by the Sand Creek Ditch system from Sand Creek to Sheep Creek, this exhibit shows:

For the year 1902, 1925 acre feet; for the year 1903, 1713 acre feet; for the year 1904, 6810 acre feet; for the year 1905, no diversion; (614) for the year 1906, 5004 acre feet; for the year 1907, 5400 acre feet; for the year 1908, 2092 acre feet; for the year 1909, no diversion; for the year 1910, 783 acre feet; for the year 1911, 4418 acre feet; for the year 1912, 2157 acre feet; for the year 1913, no diversion.

In my direct testimony, I stated that I used a sheet called "water supply table 469", prepared by Robert Follansbee, printed for the year 1923, as a source of part of my information. As to how he got his source of information concerning the matters I have just read, referring to Page 239, I find that Mr. Follansbee states the gauges are maintained on each ditch and was read by the water commissioner. The following table showing the total yearly amount diverted by each ditch was compiled from two sources, the portion to 1913 from evidence submitted in the Colorado-Wyoming lawsuit, and that subsequent to 1913, from the weekly reports of the water commissioner.

Turning to page 240, the table that he has just mentioned is the annual diversions from Laramie River Basin, 1899 to 1921, in acre feet. The table that he says he has prepared from the evidence in this other case is the same—the same

values occur in the two tables to the (615) year 1913. That was the time where Exhibit 124 terminated. His table contains years subsequent to that:

For the year 1914, 935 acre feet; for the year 1915, 1990 acre feet; for the year 1916, 2870 acre feet; for the year 1917, with the foot note, "no diversion reported"; for the year 1918, 2340 acre feet; for the year 1919, 2510 acre feet; [fol. 536] for the year 1920, no diversion; for the year 1921, no diversion.

Mr. Todd: We offer in evidence the Exhibit 124, the table as to the diversion of Sand Creek, and also, the Pages 239, explanatory matters read into the record, and 240, the table prepared by Mr. Follansbee as read into the record, said Pages 239 and 240 being found in Water Supply Paper 469, being Exhibit 42 heretofore introduced in evidence by the Complainant.

Mr. Greenwood: Just as read into the record now?

Mr. Todd: Yes. I believe that is all.

Recross-examination.

By Mr. William R. Kelly:

I have seen a copy of this pamphlet, Water Supply Paper 469, before. On page 240, there is shown the diversions by (616) the Laramie-Poudre Tunnel, in the third column; and below that, in pencil, I think is my writing. I obtained the data, that I have extended there in pencil, for the years 1922 to 1927, inclusive, from the water commissioner's records.

Mr. Kelly: We would like to offer this page 240 for the purpose of showing the diversions of the Laramie-Poudre Tunnel, and the extensions thereof made by Mr. Meeker, for the years following the printed years, to show the diversions as computed by Mr. Meeker. This is also a part of Complainant's Exhibit No. 42. I would like to ask leave to substistute a photostatic copy of this page, in order that there will be no duplications of the books.

As to what water commissioner's records I took those pencil extensions from, it has been a good many years since I made them. I probably got them from Mr. Cogswell's office, Chief division engineer of Water Division 1 of Colorado. I am under the impression that I did not compute

[fol. 537] the quantities in acre feet from the weekly reports, but secured the figures from Mr. Cogswell. Mr. Cogswell's office was the office provided by law as an official repository of those official records at that time—that is, under the Colorado system, the water commissioner's report to the division engineer.

(617) At that time, I was employed by the State of Colorado as engineer on interstate river matters—on engineering matters that involved the water supply of various rivers. I could not state what year I made these extensions in pencil. There is no date there, but it was undoubtedly subsequent to 1927; at least prior to 1929.

Mr. Kelly: It is understood that a photostatic copy of this page will be inserted?

Mr. Greenwood: That is, page 240 of Water Supply Paper 469?

Mr. Kelly: Yes.

Beginning with the printed record or list of diversions from Water Supply Paper 469, as shown on page 240, the annual acre foot diversions through Laramie-Poudre Tunnel, and continuing through my pencil extensions, are:

For the year 1914, 813 acre feet; for the year 1915, 4960 acre feet; for the year 1916, 4520 acre feet; for the year 1917, 392 acre feet; for the year 1918, 10700 acre feet; for the year 1919, 4090 acre feet; for the year 1920, 12400 acre feet; for the year 1921, 9230 (618) acre feet; for the year 1922, 7140 acre feet; for the year 1923, 10400 acre feet; for the year 1924, 4270 acre feet; for the year 1925, 11200 acre feet; for the year 1926, 5160 acre feet; for the year 1927, 7690 acre feet. These are the annual reported diversions from the Laramie River Basin in acre feet, as shown in this Water Supply Paper 469, for the Laramie-Poudre Tunnel for those years.

Mr. Kelly: I believe this reading of this into the record will obviate the necessity of furnishing any copy.

[fol. 538] Since yesterday, I have looked up my notes so as to be able to testify as to what water I found running at the tunnel on Easter Sunday of this year. 3.83 second feet was running. I measured it in the Venturi flume, with the enamelled staff gauge height of 0.32 at the commencement and 0.33 at the end.

Redirect examination.

By Mr. James A. Greenwood:

That was a current meter measurement.

(619) Cross-examination.

By Mr. Lawrence R. Temple:

I am familiar with the procedure in Colorado in reference to the adjudication of priorities of the right to the use of water. Water rights or priorities are adjudicated in Colorado according to the testimony entered before a referee, who makes certain findings to the court. The court may or may not modify those findings. The flow or capacity of the ditch is arrived at in second feet.

I do not recall that there is any provision under the laws of Colorado, or that there has ever been any provision under the laws of Colorado, which provides that the flow in a ditch or decreed to a ditch may be in any other than second feet. I think that it is a fact that there is none.

I do not believe that I have seen Complainant's Exhibit 83; I had no connection with it. I do not recall having seen it before it was offered. Referring to Exhibit 83, I find the date is in accord with (620) the decree of the Skyline Ditch, or Laramie River Ditch, on file in the office of the State Engineer of Colorado, and the original decree is for 400 second feet instead of 18,000 acre feet per year.

I have frequently referred to the decrees of District 48 in the office of the State Engineer of Colorado. There is a decree on file in the State Engineer's office which refers to 18,000 acre feet with reference to the Skyline Ditch. It is the Laramie River, or Skyline, on Page 3 of the table of decrees of the State Engineer's office. The original de-[fol. 539] cree provides for 400 second feet.

There is another decree on file in the State Engineer's office with reference to the Skyline Ditch—the interstate decree, which supersedes. That is found in the correspondence, or records, in the office of the State Engineer. When I say "records", I mean in the files. I think it is a copy of the original decree, handed down (621) in June, 1922, by the United States Supreme Court, and that is the basis for this 18,000 acre feet which is appended here at the end of ditch decrees in Water District 48.

Exhibit 83 is that appended list; it is taken from the end of the table of ditch decrees, which is a special document in the State Engineer's office. The decree book in question is not certified; it is a compilation of the ditch decrees giving the names of the ditches, the sources, the date, the amounts, the location of the headgate, and so forth. It was compiled by the State Engineer's office. It is a constant compilation that is built up from time to time as incoming decrees are entered. As to who compiled this compilation which is referred to as an appended list—I am referring to photostatic copy of Pages 1, 2 and 3 of the ditch decrees, District 48, Division No. 1, State Engineer of Colorado. The appended list which I have mentioned was compiled by employees of the State Engineer's office—I do not know who.

I think that appended list is in conformity with the (622) decree of the courts of Colorado with reference to the Skyline Ditch, because it gives the Laramie River decree as Priority No. 23, as originally adjudicated, for the Skyline Ditch, or Laramie River Ditch; and then, at the end of the table, is given the Supreme Court limitations for both the Laramie River Tunnel—Greeley-Poudre—and the Laramie River, Skyline Ditch. So that my testimony now is that the records of the State Engineer's office show that the decree for the Skyline Ditch of the Water Supply and Storage Company was for 18,000 acre feet, since the limitation by the Supreme Court as of June 5th, 1922.

[fol. 540] As to what flow would be required in the Skyline Ditch throughout a season to approximate 18,000 acre feet, that would depend upon the period of time, as well as upon the quantity. Under the laws of Colorado, the question of time does not enter into the amount of the decree; the ditch can divert as long as it wishes, when there is water.

As to the capacity of the Skyline Ditch, I can only give you an approximation; I would say, roughly, about 200 second feet. I do not remember taking the cross-sections and figuring the capacity; I have made meter measurements in it. The highest flow I have found in the Skyline Ditch was 142 second feet, on July 11th, 1929.

(623) I measured the Skyline Ditch during the time of the former hearing in the original case in the United States Supreme Court; I made several measurements in 1913.

The highest flow I found at that time was 55.63 second feet, on July 22nd, 1913. With that measurement in July of 1913, it would take 165 days to divert 18,000 acre feet; and with the flow in 1929 which I have mentioned as 142 second feet, it would take 64 days to divert 18,000 acre feet.

I have a copy of Complainant's Exhibit No. 41, being the table which I prepared in connection with the diversions from the Skyline Ditch. I refer to an unreported diversion during the period from June 6th to June 26th, 1929, by means of the Skyline Ditch. I do not know whether there was any reference in the water commissioner's report as a reason why a portion of that time was unreported; I found no such note.

(624) I referred to the water commissioner's report for that period of time, from June 6th to June 26th, 1929, and specifically that portion which shows the imported water into District 3, for the weeks in question. I find no notation here which indicates the reason why the water was unreported. I made other investigation in connection with that; I searched all of the records. I found no reference to any water that was unreported. I did not make any inquiry of the water commissioner of District 3; I took his official reports, which are the basis of the amount of water in acre feet diverted by the ditch during the year. [fol. 541] I did not make any investigation as to whether the water was turned out of the ditch at its headgates; I am taking the records at face value, Mr Temple, as filed in the State Engineer's office, and that period of time shows a difference of 1,633 acre feet.

I presume I did testify that that water, which was unreported, went to the benefit of the owner of the Skyline Ditch, on account of its having been stored in Chambers Lake, but I would have to read the record to find that statement, Mr. Temple. I am familiar with Chambers Lake, which is a reservoir constructed in the channel of (625) the Poudre River. I do not know what the decreed capacity, permitted gauge height, of Chambers Lake was in 1929; I made no study of that feature.

Water coming from the Skyline Ditch is not necessarily stored in Chambers Lake. It may pass on through to the river below; it could pass through, or be stored. I do not know what the depth of Chambers Lake is at the outlet; my work was confined to the trans-mountain diversion

water when it came into the Poudre River. My investigation stopped when it was diverted into the Poudre River according to the water commissioner's weekly reports.

I did investigate to see whether some of the Skyline water went to the Larimer County Ditch of the Water Supply and Storage Company. That happened because of some testimony which I found in the District Court at Fort Collins in an adjudication proceeding now underway, and the documents so referred to are in Mr. Stover's office, the referee. I did not examine the testimony with reference to the Skyline Ditch itself, which had been taken many years ago.

(626) As to whether the decree itself provides that water from the Skyline Ditch may be stored in certain reservoirs down the Poudre, I am not familiar with that phase of it. I do not think I have seen it in the decree, Mr. Temple.

I testified that there was some 490 acre feet of water [fol. 542] diverted from the Skyline Ditch through the tunnel, as shown by the water commissioner's weekly reports. It is possible to divert water from the Skyline Ditch through the tunnel, by arrangement. The physical situation is this: the tunnel is located at an elevation of 8,660 feet, while the Skyline headgate has an elevation of 9,500. If the water were not taken out of the Skyline, through arrangement with the Laramie-Poudre Tunnel, it could be taken into the tunnel and into the river and used below. It could not be taken physically through the Skyline Ditch, but by some arrangement, I said, whereby the tunnel was loaned to the Skyline Ditch. In other words, there would be no diversion through the ditch if that same water were sent through the tunnel.

It is quite true that it would be necessary to close the headgate of the Skyline in order that the water might flow on down to the tunnel; but I discussed that feature with water commissioner McAnnely and asked him about that very arrangement, and he stated that legally, of (627) course, the water could not be taken through the Laramie-Poudre Tunnel for the Skyline Ditch, but that when the water was taken through the tunnel for the Skyline Ditch, it came through as Laramie-Poudre water, but that he distributed it according to the orders he received; and in that arrangement, there is an evasion there and results in a transfer of water from one to the other.

It is true that according to the reports, this 490 acre feet, which I found, was charged to and made a part of the diversion of the tunnel system; and it is also true, according to another portion of the report, that it was delivered to the Skyline owners. It was charged to the Laramie-Poudre Tunnel, or the Greeley-Poudre District, as a part of its diversion from the Laramie River, according to the official reports.

My testimony is that I want to charge, not only the Laramie-Poudre system, but the Skyline, with a portion of that water—490 acre feet. I do not want to charge both companies for the amount of that diversion. I have [fol. 543] not said so; if it is charged to the Skyline, it is taken out of the Laramie-Poudre; it is not charged to both simultaneously. (628) That increases the diversion from the Laramie River itself, to the Skyline Canal, which was the object of the testimony. As to how it increases the burden on the Laramie River through the Skyline diversion, if the Skyline diversion is in excess of 18,000 acre feet, as it was in that year, by including that water, it becomes an additional burden on the Wyoming water.

As previously testified, I determined that 19,274 acre feet was diverted by the Skyline Ditch during the year 1926. I do not recall at this time the exact figures as to how much water I determined was diverted by the Laramie-Poudre system during that year. I have them, but I do not find any data here as to that; I will have to look it up. I would say, substantially around fourteen to fifteen thousand acre feet, but I would like to verify that by referring to my figures when I have time. Fourteen to fifteen thousand acre feet through the tunnel, from the records of the State Engineer's office.

As to whether it would be fourteen or fifteen, I will have to look it up; I will be glad to look that up at noon. I refer to exhibits introduced from the State Engineer's office, original records, and to records which were not introduced but from which I deducted a (629) quantity, and from testimony by Mr. W. B. Freeman and Mr. Powell. That includes the water commissioner's report from District 48 for that year. No, I did not include page 240 of Complainant's Exhibit 42, Water Supply Paper 469; I did not use that figure on that. It also included the automatic charts—any records of unreported water that I determined.

I determined 326 acre feet as the unreported water for the Laramie-Poudre Tunnel for that year. I think 326 acre feet of unreported diversion for that year is all. As I recall, the reported water, as shown by the gauge, was a matter of 11,572 acre feet. As to whether I have the ex- [fol. 544] act figures, I do not find them at my finger tips right now; permit me to refer to one of the exhibits.

In reply to your question, referring to Complainant's Exhibit 3, the water commissioner's annual report for District 48, shows on line 10, for the Laramie River Tunnel, diverted from March 1st to October 1st, 590,120,320 cubic feet. Transposing that into acre feet, (630) I have 13,572 acre feet; adding 326 acre feet of unreported water, gives 13,898 acre feet, not including the unreported water testified to by W. B. Freeman, engineer. I arrived at the 326 acre feet unreported by referring to the automatic gauge heighth charts and the water commissioner's weekly reports. The weekly reports I refer to are of Water District 3.

I took the reports of the water commissioner of District 3 and the gauge heighth to show unreported diversions, and determined from the commissioner of District 48 the amount of the diversions which were reported, for the reason of certain testimony that has been introduced in this case, and also for the reason that the water commissioner's report of District 48 is an official record of the State Engineer's office. The weekly reports of the water commissioner of District 3 are official records in the State Engineer's office, and I used them as far as they went.

The water commissioner of District 3 reported as diversions (631) through the tunnel for the year 1926, 5,644 acre feet. My unreported diversion was 326 acre feet. As to how much Mr. Freeman's unreported estimate was, there was a slight overlapping there; I think it was two thousand acre feet. As to its being three thousand acre feet, I was taking out the December flow in 1925. Without referring specifically to the Drummond testimony, I would say approximately fifteen hundred acre feet was diverted during 1926, that is not included in either of the two figures I have given.

The difference between the reported diversions and the unreported diversions, which I found and testified to, in

[fol. 545] the water commissioner's report for 1926 in District 48 is 8,254 acre feet. As to how many second foot flow that would require during the period through the tunnel to make up that difference, for the period of time unreported by the water commissioner of District 3, as reported by Major Freeman, I think I had better figure that up at noon —that will take quite a little time. I will have to find the dates, you understand.

Referring to page 240, Water Supply Paper 469, the amount of my pencil notation as to the diversion through the Laramie-Poudre (632) Tunnel for 1926 is 5,160 acre feet. As I previously testified, I think that figure came from Mr. Cogswell's office. It came from the reports of the water commissioner of Water District 3 — that is the origin of Mr. Cogswell's annual diversions in trans-mountain ditches from the Laramie River.

The water commissioner's reports for the year 1926 show 5,644 feet. 5,160 feet is not my estimate; the figures entered by me from the division engineer's office are 5,160 acre feet, which is even less than the report of the water commissioner of District 3.

I was at the east portal of the tunnel in 1926, but not at the west portal. As to what the greatest amount of water was that I found flowing from the east portal of the tunnel in 1926, my visit at that time was casual, not in connection with the present case. I made no measurements; I do not know how much was being diverted. I (633) did see water flowing through the tunnel in 1926, or flowing from the tunnel at the east portal. My trip at that time was a casual trip with reference to other matters; I was not estimating the water diverted by the tunnel. I did not make any estimate at that time of the amount of water flowing from the tunnel.

As to whether or not in my opinion, from my knowledge of the situation at the west portal of the tunnel in 1926, it would have been possible to have diverted 13,000 and more [fol. 546] acre feet during that season, I just stated, Mr. Temple, that I was not at the west portal in 1926. I have had full information as to the diversions for the Skyline since 1913; I have availed myself of the records. I have not investigated the flow past the tunnel intake.

Prior to 1930, there were other sources of supply for the tunnel other than the regular flow of the east and west

branches of the Laramie River. The Link Ditch brings water across at a high altitude and discharges into the west branch of the Laramie a short distance below the Skyline Ditch. Originally it was not a part of the west branch; it (634) is another stream diversion that puts water that originates in another branch of the Laramie, into the west branch of the Laramie. I think that covers the sources. The flow of the west branch of the Laramie below the Skyline headgate, and the Link reservoirs, and the east fork of the Laramie, were, until 1930, the sole source of supply of the tunnel. After lunch, I will give you the total diversion for 1926 from the tunnel.

Forty-four more days flow are reported by Mr. Mosier, commissioner for District 48, than by Mr. McAnnely during the season of 1926. It would require ninety second feet of water per day to flow through the tunnel, for those forty-four days, to reconcile the difference in the amount reported by the water commissioner of District 3 and the water commissioner of District 48 for that year. As to the days figured with reference to the beginning and end of the season, the water commissioner of District 48, from March 1st to October 1st; Mr. McAnnely, (635) May 5th to September 22nd. The greater number of days would be figured at the early part of the season, from March 1st to May 5th.

I can get a record which might disclose the average flow of the Laramie River during the period of time from the 1st of March to the 5th of May, 1926. Referring to the water commissioner's weekly report of Mr. McAnnely in District 3, ending on July 10th, I find the average flow for the seven day period was 47 second feet through the tun-[fol. 547] nel, which is the maximum for that entire year of 1926, as recorded.

I recall that Mr. Freeman's testimony was that on March 21st, 1926, he visited the tunnel and there was no water coming through. That would slightly increase the burden above ninety feet, if the tunnel had been closed for some days.

(636) I have the figures you requested before lunch. I find the flow through the tunnel in 1926 to be 15,128 acre feet. I arrived at that figure from Exhibit 3, water commissioner's report of District 48, March 1st to October 1st, 13,572 acre feet—unreported, as computed by Meeker from the charts, 326 acre feet; reported by Freeman, 1,230 acre feet, January 1st to February 27th. My unreported diversion of

326 acre feet covered the period of time from May 1st to May 4th. That could be a duplication of the 13,572 acre feet reported by Exhibit 3. I believe it would be, under the circumstances—the fact that the water commissioner's report of District 48 covered the period of March 1st to October 1st. (637) I do not know, of my own knowledge, from what source the water commissioner of Water District 48 obtained his figures showing the diversion of 13,572 acre feet through the tunnel; I have not been informed by any one. It is usually secured from officials of the company. The amount of this particular diversion might have been obtained by personal conference with the water officials of the Laramie-Poudre Tunnel. I did not ask Mr. Mosier how he obtained those figures. I have not asked any one how those figures were obtained; all I was interested in was the official reports of the State Engineer's office.

There are no weekly reports of the Water District 48 for the year 1926. As to whether there is any measuring device, or whether there was during 1926, by which the water commissioner of District 48 might have taken any measurements, I could not answer that; there are measuring devices at the inlet on the west end. They are not in operation at (638) the present time. I think they were once in opera- [fol. 548] tion, but I could not give you the period of time.

There is a wooden Venturi flume, with a twelve foot throat, in the inlet canal, and an automatic gauge house; and then above that, there is an old concrete rectangular flume with a gauge house. The reports of the water commissioner do not show that he ever used either of those devices in 1926. With reference to his visits to the west portal of the tunnel during that year, the reports of the water commissioner of District 48 show no official visits.

I do not know whether there was an attendant at the west portal of the tunnel during the year 1926. There was an attendant there in 1929; I talked to him. I think his name was Shannon. There are telephone lines between the west portal of the tunnel and the water commissioner of District 48, but I do not know whether telephone communication was possible between those two points. The water commissioner (639) lives down on McIntyre Creek, a matter of about ten or twelve miles from the tunnel, as I remember.

I have not investigated to find where the water commissioner obtained his information as to the amount of this diversion through the tunnel in 1926; I have accepted the official report at face value. I have made no investigation to determine or to learn where he arrived, or how he arrived at that figure. I have no record of the amount of water which was diverted through the tunnel on March 1st, 1926—only as given by the water commissioner of District 48. As to what that amount of water was, as shown by his record, you could not segregate it; it is given as March 1st to October 1st. I have, only in the mass, the amount of water which was diverted through the tunnel on October 1st, 1926. I have only what is shown by the water commissioner's weekly reports as to the amount of water which was diverted through the tunnel on any day during the year 1926.

(Witness procures documents from Mr. Hinderlider.)

The first week is reported as of Saturday, May 15th, and [fol. 549] for the week, 26 second feet daily average as diverted by the Greeley- (640) Poudre Tunnel—for the week ending May 15th, 1926. I am reading from the report of W. J. McAnnely, water commissioner District 3. There are no weekly reports that I know of from Water District 48. I gave the first weekly report for 1926 from Mr. McAnnely.

Complainant's Exhibit 62 is the first sheet of the weekly reports of water commissioner of District 3 for 1926. It shows the number of days, four, Greeley-Poudre Tunnel. I think the figure is 15.9 or 15.7, I cannot be sure of that; it might be 5.7 second feet. That is for the period, May 5th to the 8th, 1926. I have a correction—the quantity for the four-day period ending May 8th, was 59 second feet average daily.

Exhibit 62 is the first weekly report from any source that I have found reporting any diversion through the tunnel in 1926. Mr. (641) Freeman's report is for the period of time from January 1st to February 27th, 1926, as I have used it. I do not know whether there was any time during that period when there was in excess of 12 second feet flowing through the tunnel. There was a time between the 27th of February, 1926, and the 4th of May when there was 59 second feet flowing through the tunnel.

On May 1st, for eight hours, 39 second feet; May 2nd, 42 second feet; May 3rd, 48 second feet; and May 4th, 60 second feet—those being the average daily discharges. Those figures were computed from the automatic gauge heighth charts at the State Engineer's office at Denver. At the time of the measurement, they were located at the east portal of the Laramie-Poudre Tunnel. There was no chart on file with the State Engineer prior to the chart of May 1st, 1926.

(642) I do not think, in my computation of 13,572 acre feet, as shown by the report, Exhibit 3, there is included the 490 acre feet which I called "unreported diversion" of Skyline appropriation through the tunnel, because, referring to Exhibit 3, the water commissioner's report for Dis- [fol. 550] trict 48 shows the 13,572 acre feet charged to the Laramie-Poudre Tunnel. That is also true so far as the 490 acre feet is concerned by the report of water commissioner of District 3.

As to what average of diversion through the tunnel I took to arrive at 1230 feet on the Freeman report, I accepted his figures in acre feet, as he testified. I do not believe there was information whereby I could check his figures. I took Mr. Freeman's figures for the 1230 feet. Mr. Freeman testified on cross examination to that amount of water as being the amount between the two dates that I have mentioned.

In figuring my diversion through the tunnel for 1926, I accepted at face value the water commissioner's report showing 590,120,320 second feet. As to assuming its correctness, naturally, I take it at face value. I assume that that is correct; and I assume that the water (643) commissioner's reports from District 3 are incorrect, because of disagreements between the charts, automatic gauge charts, and the weekly reports of the water commissioner, and the testimony of W. B. Freeman.

I think there is a method by which you could reconcile the amount of diversion, of 590,120,320 cubic feet diversion through the tunnel in 1926, with the water commissioner's report from District 3, and the automatic gauge chart. During the year 1925, the Skyline Canal diverted, in round figures, 15,000 acre feet; the Laramie-Poudre Tunnel, 11,000 acre feet, making a total, in round figures, of 26,000 acre feet. 1925 was about a sixty per cent year on

run-off at Jelm. The year 1926 was above normal, about 108 per cent of normal, on the Laramie River at Jelm, so that the water supply was almost double in the Laramie River headwaters in 1926 as against 1925. Now, the figures I refer to were the reported diversions in 1925, when 26,000 acre feet were reported as diverted by the two systems. I do not recall now whether the figure shown by the water commissioner's report in Water District 48 for 1925 as diversions through the Laramie-Poudre Tunnel is on the annual report or not.

[fol. 551] The Laramie River was about 108 per cent in 1926. I do not know as to whether that is also true as to the Cache la Poudre (644) River; I did not investigate that. I do not know that it was an abnormal year throughout the entire territory; I have not compared figures on other streams.

I have been familiar with the so-called Lost Lake System since 1929. I do not recall of any study of it in 1913, when I was working on the Laramie River for the purpose of the former case between the two states. I did not look over the testimony in the adjudication proceedings before Judge Stover, with reference to the Lost Lake System. I have not paid any attention to that particular branch of this case.

As to whether I made any investigation as to the diversion through what is known as the Bob Creek Ditch in 1926, I think I referred to the water commissioner's annual diversions; I also was in the field and examined that ditch in July, 1929. I have the amount of the diversions through that ditch in 1926 in the other room. I also have the same data with relation to the Columbine Ditch. These are the reports of the water commissioner—no independent determination by myself. As to accepting them at their face value, I take them as the official records of the state. I did not make a study of the correctness or (645) incorrectness of those records; I have some doubt about the correctness of them.

I have no figures on those ditches, except the annual diversions by the water commissioner. They show, Bob Creek Ditch, for the year 1926, no diversion; Columbine Ditch, for the year 1926, no diversion. I have figures which purport to give the amount of the diversion of the so-called Lost Lake System for 1926. That diversion was 448

acre feet—the same source of information. I have not investigated as to its correctness and I do not make any assumption that they are correct; I take them at face value. The face value of the diversion through the Lost Lake System is 448 acre feet for 1926.

[fol. 552] With relation to the diversion of the Sand Creek System during 1926, my figures are, annual diversion, from the weekly water commissioner's reports, 2,234 acre feet. As to what they are according (646) to the Meeker investigation, I have not tabulated the daily diversions and computed them off the charts for that year. I do not assume the correctness or accept the reports of the water commissioner at face value for the Sand Creek System.

As to wherein I find error during the year 1926, there is considerable doubt about that figure, for the reason that the rating table used was prepared in the year 1922 and the shifting channel conditions at the rating flume lead to uncertainty. I was not interested in the percent of error and made no determination of that; I was interested in finding out as to the accuracy of the record as reported and as computed, and so forth.

The total diversion from the Laramie River in Colorado to the Cache la Poudre River Basin in Colorado for the year 1926 reported by the water commissioner is 25,462 acre feet. I have made no figures on the total diversion from the Laramie River to the Cache la Poudre River in Colorado in 1926. I believe the water commissioner's reports are incorrect as to certain elements that comprise that total. The correct figure is 36,758 acre feet.

In arriving at that figure in 1926, I have added to the (647) Skyline, eighteen thousand. As I previously testified, the grand total diversions, 1926, Skyline, 19,274 acre feet. That would be 1,274 acre feet excessive diversion, which includes the 490 feet which was reported through the tunnel.

I found no diversion in excess of 15,500 acre feet through the tunnel. As to what I found through the Bob Creek Ditch for 1926, I accepted the face value of the water commissioner's report—no diversion. I found through the Columbine, no diversion; 448 feet through the Lost Lake System, and 2,234 feet through the Sand Creek. I have

[fol. 553] taken no other diversions to make up the 36,758 acre feet for 1926.

You understood me correctly, that the water commissioner's reports show 25,462 for that year; the Skyline was reported at 17,136. (648) I have added more than 1,274—the difference between 17,136 and 19,274, 2,138. And I have added 448 acre feet from the Lost Lake System, and 2,234 from the Sand Creek System, which makes a total of 36,758.

I have read and am familiar with the amended compl at in this action, and the several amounts of water said to have been diverted from the various works. I think I furnished the figures to the Wyoming officials for 1927 regarding the Skyline Ditch. I took those figures at face value; that was prior to my investigational study as to the accuracy of the records. As to finding any errors in the records, I have made no detailed check of the year 1927, and I prepared no detailed figures for the year 1928 or 1929; but permit me to state that I have studied all of the charts and rating tables of the Skyline Canal for the years in question. (649) As to the reported water diverted through the Skyline in 1927, 1928 and 1929, I believe them to be covered by the weekly reports and the automatic gauge charts. I have confidence in the reports of the water commissioner and the automatic gauge charts for those three years, but I have no confidence in the record of 1926 after the study led into a special analysis of that year, due to disagreements between the water commissioner's reports and the charts.

As to my assuming the correctness of the report of the water commissioner of District 48 in compiling my figures for 1926, aren't we a little confused here? I am talking about the Skyline Ditch diversions. As I understand it, we were discussing the Skyline, and you have switched to the Laramie-Poudre.

All of the water commissioner's reports for 1926, 1927, 1928 and 1929, in Water District 3, include both those diversions; and for three years, in 1927, 1928 and 1929, I [fol. 554] have no fault to find with the water commissioner's reports of water going into District 3, with reference to the Skyline diversion, only.

(650) I have made no figures as to the total diversion from the Laramie River into the Cache la Poudre River in 1927; I have accepted the 1927 water commissioner's

reports. The total diversion into the Cache la Poudre River from the Laramie River in 1927, as reported by the water commissioner of District 3, was 34,654 acre feet. That includes 3,334 acre feet from the Sand Creek System.

I take that report for 1927 at its face value with reservations. The rating table, being six or seven years old, under shifting conditions prevailing at the rating flume, lead to uncertainty as to the reliability of that record. That is, at Sand Creek. There were no other objections to those figures for that year at this time.

I find the total diversions from all sources from the Laramie River into the Cache la Poudre River in the year 1928 to be 31,606 acre feet, as reported by water commissioner McAnnely of District 3. Of that amount, 1,084 acre feet was Sand Creek Ditch. I do not (651) assume the correctness of those reports, because of the rating table being used, that was prepared in 1922, with the shifting channel conditions prevalent at the rating flume; also the character of the automatic gauge heighth charts, both as to this year and the former years. I am referring specifically to the Sand Creek System at this time. I have no objections to the reports as to the other diversions as to accepting them as the water reported. I could not add anything to them as to water unreported without a more careful study.

As to 1929, I found the total diversion from all sources from the Laramie River to the Cache la Poudre River to have been 41,210 acre feet, of which amount, 5,688 acre feet was from the Sand Creek System. In arriving at these figures for the year 1929, I did not figure the Skyline diversion; I accepted the official record of 24,363 acre feet, which is the official record.

[fol. 555] I do not know how much of that total was through the Laramie-Poudre Tunnel; I made no determination. 5,688 acre feet was reported through the Sand Creek System, 1,153 through the Bob Creek, (652) and 590 through the Columbine. I estimated the Lost Lake System in this particular case. The previous figures did not include any Lost Lake, but this figure includes an estimate of 460 acre feet. The total diversion as reported is 8,954. Outside of the estimate of the Lost Lake, I have accepted the records for 1929 making up this total of 41,210, at face value. I believe I took the figure of 24,363 acre feet for the Skyline from the official records; I can check that later.

I found the total diversion from all the works for the year 1930 from the Laramie River to the basin of the Cache la Poudre River to have been 25,533 acre feet, of which, the Sand Creek System diverted 2,885 acre feet. As to my assuming the correctness of that total diversion for that year, my table is prepared to show the total reported water. As to whether I know if there was any unreported water, I cannot answer that specifically without referring to a mass of records. We may assume (653) that is approximately the correct amount diverted for that year as to the amount reported, only. I am not offering any objection at this time to the diversion as reported; I am not making any modification at this time of that amount. I did not assume the correctness of the report due to the fact that the record on Sand Creek is open to question. That is the only objection I have to offer at this time; I do not know that I will have one later.

My figures show the total diversions from all sources from the Laramie River to the basin of the Cache la Poudre River to have been 19,283 acre feet in 1931, of which, the Sand Creek System diverted 2,150 acre feet. I have reservations on assuming the correctness of the reports in giving these figures. The rating table being used, nine years old, under shifting channel conditions in the rating flume, automatic gauge heighth chart of poor quality of records, are the reservations. That applies specifically to the Sand Creek System; it does not apply to others than the Sand [fol. 556] Creek System.

(654) As to whether I have any additions to make to the total diversion as shown for 1931 by reason of my investigation, I would qualify the figures as slightly uncertain, because of the inclusion of the Sand Creek quantity. By reason of that uncertainty, I would add to the total figure a variable percent, depending upon the flow. The actual quantity diverted for the year 1931 is in excess of the reported quantity. As to how much, I am not giving any specific figure without time to go into it farther. I have not made an estimate of that which will fit the question you ask.

The figure for the year 1931 does not include any amount from the Lost Lake System. I know of no reported diversion by means of the Lost Lake System in 1931.

The total diversion, as I have figured it, for the year 1932, from all sources out of the Laramie River into the basin of

the Cache la Poudre was 37,677 acre feet. Of that amount, 5,133 acre feet was diverted through the Sand Creek System. I do not assume the correctness (655) of that report, both as to the Sand Creek Ditch and as to the Laramie-Poudre Tunnel quantities.

I have made no specific discount of the figures on the Sand Creek System for 1932. As I indicated previously, the table I have prepared was to arrive at the total reported quantity diverted, and it made it at considerable variance with the actual quantities diverted due to the inaccuracies in the Sand Creek rating flume, and also in the Venturi at the Greeley-Poudre; and I wish to correct my testimony as to the prior years as to the Greeley-Poudre Tunnel and to state that those records through the Venturi are unreliable, as I previously testified in this case. As to the amount of error I find in the tunnel diversion, I can give no specific figure for the year 1932. 13,652 acre feet was reported for 1932, by the Laramie-Poudre Tunnel.

Going back to 1931, I believe I found no reported diversion from the Lost Lake System for that year. Among the weekly reports, is a sheet dated August 27th, signed by [fol. 557] water commissioner McAnnely, stating "Lost Lake 50.7 second feet for twenty-four hours." That shows (656) that a report was received by the State Engineer's office on August 28th, 1931. That would amount to 100 acre feet.

I testified that I had examined the record of diversions from the Laramie River to the Cache la Poudre basin beginning with 1923 to through 1932. The water reported by the water commissioner for the year 1923 from the Laramie River to the Cache la Poudre Basin, was 31,362 acre feet. I made no independent summary of the quantities diverted. The source from which the water came to make up that amount was the headwaters of the Laramie River by the Skyline Ditch, from the headwaters by the Laramie-Poudre Tunnel. The separate quantities were, 16,028 by the Skyline, 10,252 by the tunnel, 3,576 by the Sand Creek or Divide Ditch, Bob Creek 1,174, Columbine 332. There is no record of diversion through the Lost Lake System.

The total diversions I found from my investigation for (657) the year 1924 from the Laramie River to the basin of the Cache la Poudre, was 15,320 acre feet, as reported by the water commissioner. I do not assume the correctness

of that report, my objections to it being the records of the Laramie-Poudre Tunnel and Sand Creek Ditch. Sand Creek Ditch is affected in that it has very poor automatic gauge charts, exceedingly choppy, with lack of staff gauge entries on the charts so the pen reading can be verified when such disagreements do occur between the pen and the staff gauge readings. As to an example, I have already so testified.

Of that amount of 15,320 acre feet, 570 are reported as diverted from the Sand Creek System. In 1923, 3,576 was reported as diverted by the Sand Creek System.

Coming to the year 1925, I found the total diversion from all sources out of the Laramie River into the basin of the Cache la Poudre to be 31,270 acre feet. I do not assume the [fol. 558] correctness of that report. My objections are the Laramie-Poudre Tunnel records and Sand Creek Ditch records. I am unable to state at this time whether those objections would add to or subtract from the amount charged to the ditches mentioned.

(658) Of that amount of 31,270 acre feet, 3,998 acre feet are reported as diverted through the Sand Creek System. As to the correctness or incorrectness of that report, I consider the records of that year to be exceedingly poor, undependable.

Referring to the year 1929 again, the figures disclose diversion from all sources out of the Laramie into the basin of the Cache la Poudre, exceeding the diversion from the Sand Creek System, to be 35,522 acre feet. Those amounts are made up of 24,363 acre feet from the Skyline, 460 from Lost Lake, 1,153 from Bob Creek, 590 from Columbine, and the tunnel, 8,954.

The figure of 24,363 acre feet from the Skyline diversion was taken from the weekly reports of the water commissioner. That is the only source of information I had. I estimated the amount of (659) Lost Lake diversion for that year, basing my estimate on the report for the year 1926, or 448 acre feet. As to whether I thought you had increased the size of your reservoir some twelve acre feet in the year 1929, I was not interested in that feature and made no conclusion in regard to it.

I arrived at the tunnel diversion for that year from the weekly reports of the water commissioner, and no other source—reported quantities by the water commissioner. I did not add any unreported diversions for that year on either the Skyline or the tunnel.

The Laramie River, for the year 1929, was slightly above normal, about ten per cent. That is also true as to the year 1926, when it was about nine per cent above normal at Jelm, Wyoming. There (660) were no diversions in 1926 in ex- [fol. 559] cess of the 33,500 acre feet, as reported by the water commissioner. My figure for that year gave 1,024 acre feet more diversion than the water commissioner reports, which is about three per cent. In the year 1929, I found 2,022 acre feet in excess, above the 33,500 acre feet diversion through those three sources, excluding Sand Creek, which is six per cent.

In my investigation, I did not find any other years when the total diversion from the Laramie into the basin of the Cache la Poudre, excluding Sand Creek diversion, has exceeded the 33,500 acre feet conceded to the Skyline and the tunnel.

Mr. Greenwood: We object to that question on the ground that there is no such concession that we know of.

Mr. Temple: The complaint concedes it.

Mr. Greenwood: No, not as a joint diversion.

(661) Redirect examination.

By Mr. James A. Greenwood:

My answers to those various questions regarding total diversions from the Laramie to the Poudre River, both including Sand Creek, and other figures excluding Sand Creek water, have been based upon official records and reports of the State of Colorado, including in the year 1926, the testimony of Mr. Freeman. Of the tabulated totals, with the exception of the year 1926, there was no calculation or allowances for waters that may have been, or may not have been diverted in the early season or late season, or otherwise, but not reported.

I have been interrogated with reference to the diversions for the year 1929, to which I replied there was 41,210 acre feet, which did not include the Meadow diversions. If you add to that the Meadow diversions for the year 1929, you would have, roughly, 96,000 acre feet as the total diversion for that year, which would be, again roughly, 250 per cent over 37,750.

(Looking at paper handed witness by counsel:) I believe [fol. 560] I do have a recollection of encountering that

document in searching the records of the engineer's office of Colorado. It is not a form (662) of report that I am familiar with and find in that office, just a blank sheet, with notations on it. This purports to be in August, to show the diversion of August 27th, 1931, through the Laramie-Poudre Tunnel, and also Lost Lake. This piece of paper shows, Laramie-Poudre Tunnel, 1,641 second feet for twenty-four hours, Lost Lake, 50.7 second feet for twenty-four hours.

As to whether I found any other record in the State Engineer's office, or official record of the State of Colorado, showing such diversion for the date of August 27th, 1931, through the tunnel, I think there may be another sheet that gives some acre foot quantities—a special report to the State Engineer by the water commissioner. This figure is not carried forward in any other report—for instance, in computing the annual diversion for the tunnel for the year 1931, I did not use this.

As to whether that would be 1,641 second feet in addition to any records that I considered in making up the total 1931 diversion, a portion of that might be included in the official reports of the water commissioner for the week; this being for a day, it is very likely that is included within the week.

(663) Mr. Greenwood: I will ask counsel, have you got any weekly report that includes this amount, or any portion of it? It is the week of August 27th, 1931.

(Thereupon, Mr. Temple handed documents to Mr. Greenwood.)

1,641 second feet would be 3,282 acre feet. The weekly report of the water commissioner, District 48, for the week ending August 29th, 1931, shows a four days diversion of five second feet for the week by the Laramie-Poudre Tunnel, which amount, if transformed into acre feet, would be forty acre feet for the week, and is obviously very much less than the 3,282 acre feet on the report of August 27th.

[fol. 561] (Complainant's Exhibit No. 86 marked for identification.)

(Photostatic copy of sheet of paper purporting to be an official record from the State Engineer's office of Colorado of diversion of water on August 27th, 1931, from District 48 into District 3.)

(664) Mr. Greenwood: Complainant at this time offers its Exhibit 86, being a piece of paper taken from the official files and records in the office of the State Engineer of the State of Colorado, purporting to be an official record of diversion of water on August 27th, 1931, for a period of twenty-four hours, signed by water commissioner McAnnely of District 3, in the State of Colorado, showing the diversion of water from the Laramie-Poudre Tunnel to the Cache la Poudre River, also from Lost Lake to the Cache la Poudre River, and we ask leave to substitute a photostatic copy of it.

(Complainant's Exhibit No. 87 marked for identification.)

(Photostatic copy of official weekly report of the water commissioner of District 3, State of Colorado, for the week ending August 29th, 1931.)

(665) Mr. Greenwood: Complainant now offers its Exhibit 87, being the official weekly report of the water commissioner of District 3, State of Colorado, for the week ending August 29th, 1931, showing a record of the diversions of water from District 48 into District 3, and showing diversions of the Laramie-Poudre Tunnel and the Skyline Ditch, and we ask that it be admitted in the record as evidence with leave to substitute a photostatic copy of the same and to withdraw the original.

Recross-examination.

By Mr. Lawrence R. Temple:

I did not make up any totals of diversions in 1931; I took the water commissioner's totals. That must be a part of the water commissioner's totals. I did not take any figure as [fol. 562] the diversion; I accepted the quantity. I did not figure any quantity on that or the others; I took the reports, the summations. As to finding such a summation on either Exhibit 86 or Exhibit 87, I refer to the summation for all of the weekly reports for the year; I do not find any summation on Exhibit 86 or Exhibit 87, I find the report for the day or the week on those two exhibits.

(666) I made up my figures from the summations of the weekly reports of the water commissioner. Exhibit 87 is a weekly report of the water commissioner; Exhibit 86 is a

daily report of the water commissioner. As to whether I took any figures from them in making up my totals, I do not recall whether the total was furnished by the division engineer on that, or whether I computed it; I would have to look into that matter. I will look into that matter and state whether, as an engineer, I figured 1,641 second feet for twenty-four hours as being a part of the diversion of the Laramie-Poudre Tunnel as of August 27th, 1931. I will probably be able to report on that tomorrow, and will do so.

As to whether, as an engineer, I figured that to be reported as 1,641 second feet diversion, that is the way it reads. It might be 1.64 second feet, it might be 16.41 second feet, it might be 164.1 second feet. As to whether I would, as an engineer, figure that to be (667) 1,641 second feet, it appears erroneous on its face—one daily report. That appears very high. As to whether I would figure it that way, I said it appeared that way.

As to whether, as an engineer, in computing the volume of water through the tunnel, I would figure that report as 1,641 second feet for twenty-four hours through the Laramie-Poudre Tunnel, I will answer that better after studying and reporting to you tomorrow.

As to the capacity of that tunnel, it has a very heavy grade, I think 200 feet per mile; I think the capacity is around a thousand second feet. You might put 1,641 second feet in it by piling it up. I will answer that question tomorrow, Mr. Temple.

[fol. 563] Redirect-examination.

By Mr. James A. Greenwood:

Referring to the face of Exhibit 86, which is an official record of Colorado, the plain reading of that document is that 1,641 second feet were diverted in a twenty-four hour period, and to make anything (668) else out of it does nothing but discredit the record.

Cross-examination.

By Mr. Shrader P. Howell:

In determining the discharge of a stream, I have heretofore testified that it is necessary to install certain measuring

devi . After the installation of such devices, it is also necessary to take certain discharge measurements at different intervals, the range of stage of the stream or the ditch, whereby the rating table may be prepared. I do not recall whether I testified, with reference to ditches, that two observers, in measuring the flow of a stream, being of equal skill, measuring under the same general conditions, may arrive at conclusions varying as much as five per cent. It would be true of rivers and creeks, (669) that figures may be acceptable, and yet done in a very skillful manner and by persons who are experienced, and still there will be a variation of say five per cent. in the measurement of stream flow; but referring specifically to canals and ditches, it would be nearer two per cent.

In plotting the measurements of a rating curve, they may fall slightly to one side of the adopted curve. It is true that some personal judgment must be exercised in analyzing the point to develop the curve. It may be possible for two equally competent and skilled engineers to arrive at a rating curve that would vary one from the other by an appreciable per cent on a stream, but not on a ditch or canal. That would be true on a river, but less so on a canal or ditch. It would be possible to have some minor variations.

A personal equation element enters into the determination of mean gauge heights from automatic charts, depending on the experience and knowledge of those things. Where there are separate observers as to the mean gauge heights, [fol. 564] with the same chance of variation in the process of obtaining the final results, the variation in the results obtained (670) would be very slight. There may frequently be a discrepancy in the official result of the flow of a stream at a certain point, as determined and published by separate official agencies.

Complainant's Exhibit 50 shows the flow of the Laramie River near Woods, Wyoming. The origin of the information for the years 1912 to 1921 was the United States Geological Survey, Water Supply Paper 469. Exhibit 50, my compilation, shows 3,940 acre feet flow in (671) the month of October, 1920. Water Supply Paper 469, Exhibit 42, at page 217, shows 3,750 acre feet flow for the same month, October, 1920. Complainant's Exhibit 43, which is the Wyoming State Engineer's Report for 1920-1921, at page 122, shows 3,940 acre feet as the flow of the same stream in the month of October, 1920.

The data published in the biennial report of the State Engineer, Supplement "B", were prepared by the same agency as the data in Water Supply Paper 469, the United States Geological Survey. There is a difference of 190 acre feet, which is a matter of about five per (672) cent.

As to such a difference being expected when records are worked up independently of each other, there was no independent working it out, as I understand it, in this instance. It is true there is a difference here. Both were prepared by the United States Geological Survey. The United States Geological Survey furnishes the data for printing in the biennial report, the work being carried on in a cooperative manner. The United States Geological Survey does the field work, and the computations; Wyoming pays the money.

I would say that these investigations, upon which these two sets of figures are based, were not made by different individuals. The same agency conducted the work which is printed in both documents. As to whether the mere fact that the same agency conducted in a general way work which [fol. 565] was done by both branches of service, would not necessarily indicate that the work was done by the same person, the field work would be done by the same person, but that might not be true of the computations.

Referring to Complainant's Exhibit 42, at Page 217, for the months of October 1920-1921, the mean flow given there for October (673) is 61 second feet. Referring to the same month in the report of the State Engineer of Wyoming, Complainant's Exhibit 43, the mean given there is 64 second feet. That does not indicate that the two sets of figures were the result of independent investigations by different parties. There may have been a revision by the Geological Survey. When the data was submitted in either one of the reports, there may have been a revision. The computations, Mr. Howell, were all done by the same agency. Wyoming does not compute the stream flow from data furnished by the Geological Survey; the Geological Survey furnishes the complete data.

It is quite true that the published reports in Exhibits 42 and 43 do show there is a difference in the items to which my attention was called. As to both publications being made by authoritative agencies, one to the Government and one to the state, there are two separate publications; the hydrographic records are furnished by the Geological Sur-

vey in both instances. As to whether it is true that where there is a difference, such as in the instances to which I have testified, such a difference may exist and values be equally as good, that is an awkward question to answer. The discrepancy exists, but it has its origin in the same office as the original record. As to whether one value ascertained is equally as reliable as the other, an engineer can take his choice; it is an immaterial matter, to my judgment, in the present instance.

(674) Complainant's Exhibit 52 is a comparative table of the yearly runoff of the Laramie River at Jelm, Wyoming, and Woods, Wyoming, and the Little Laramie at Filmore, [fol. 566] Wyoming. I have the recorded flow of the runoff at Jelm for the years 1905 and 1911 to 1932, inclusive. I had the records of recorded flow of the Little Laramie near Filmore, Wyoming, for the years 1911 to 1926, inclusive. As to its being necessary to make computations to ascertain the flow at Filmore for the other years, there is an appropriate note for those years (B) determined from the Jelm-Filmore curve of annual flow. In determining the relative relation between the flow of the Laramie at Jelm, and the Little Laramie at Filmore for the years for which there was no recorded amount of flow, I did not first reconstruct the flow of the Laramie River at Jelm for the trans-mountain diversions in Colorado; I took the recorded flow.

At the bottom of Exhibit 52, paragraph (B), I refer to Jelm-Filmore curve annual flow. I have that curve here. (Witness hands paper to counsel.) If there had been increased Colorado diversions during the years covered by my exhibit and I had failed to take such increased (675) diversions into consideration, it might make slight differences in the results obtained as to the flow of the Little Laramie at Filmore. The flow of a stream in any locality varies from year to year, sometimes between fairly wide limits, due to natural causes, and there are also variations which run in cycles from high and low.

It is true that the runoff in the Rocky Mountain region for the year 1931 was similar to 1919 as to all streams, and was one of the lowest of record; and the runoffs in the years 1925 and 1930 were also considerably below the normal in the Rocky Mountain region.

That is the only copy of this chart that I have; I can make you another one if you wish one, tomorrow.

Mr. Greenwood: We will supply you that in a photostat.
Mr. Howell: That will be perfectly agreeable.
The Witness: That is just the Laramie River at Fil-more—that is what you were interested in?
(676) Mr. Howell: Yes, that is all.

[fol. 567] Recross-examination.

By Mr. Lawrence R. Temple:

As to whether, as an engineer, I would figure that to be 1,641 second feet (referring to Complainant's Exhibit No. 86), if I were unacquainted with the Laramie-Poudre Tunnel and the drainage area, I would probably take it at face value; but, knowing the capacity of the tunnel and the water production of the drainage area, it is erroneous on the face of it. I have not used that figure in the total flow of the Laramie-Poudre Tunnel on that date. I used the water commissioner's weekly report, which shows four days diversion of five second feet, average daily flow.

The report of August 27th, Exhibit 86, of the water commissioner of District 3 as to diversions through the Laramie-Poudre Tunnel on the date named, is obviously in error. As I previously stated, I did not take that report into consideration in my investigation, because the weekly water commissioner's report covered the water diverted (677) by the Laramie-Poudre Tunnel. Presumably, that was also included in the water commissioner's reports for 1931. It was handed to me, but that is a daily report; the daily report would be obviously included in the weekly report of the water commissioner, and so, for that reason, I ignored it.

I never considered that there was 1,641 feet taken through the tunnel at one time, either at that time, or at any other time; it is an impossibility. I think that is the only daily report I have found in the water commissioner's reports for 1931; there may be another report showing the accumulated diversion quantities up to a specific date for the year 1931 and 1932. The fact that it is not on a blank report form did not appeal to me as being anything particularly irregular; I did not use it. I did not use any others that were in that condition.

(678) (Thereupon the complainant rested its case.)

[fol. 568] NARRATIVE STATEMENT OF DIRECT EVIDENCE OF DEFENDANT, PREPARED BY COUNSEL FOR DEFENDANT STATE OF COLORADO

[fol. 569] DIRECT EVIDENCE IN BEHALF OF DEFENDANT

M. C. HINDERLIDER, witness in behalf of defendant.

Direct examination.

By Mr. Shrader P. Howell:

(682) I have been a resident of the State of Colorado for about 33 years, residing for a time at Grand Junction, Colorado, and since that time in Denver, Colorado. I am by profession a (683) Civil, Hydraulic, and Irrigation Engineer, and have been engaged in the practice of my profession since about 1898. I graduated at Purdue University, which is the State University of Technology of Indiana, in 1897, with a degree of Bachelor of Science in Civil Engineering. From 1897 to 1898, I was on the Public Land Surveys in Colorado; from 1899 to 1900, I was a draftsman in the Board of Public Works of the City of Denver; from 1901 to 1902, I was a hydrographer in the State Engineer's office of Colorado. From 1902 to 1904, I served as District Engineer in the United States Geological Survey, in charge of all the hydrographic work in Colorado; from 1904 to 1906, I was in charge of all the Government hydrographic work in the States of Colorado, Wyoming, Nebraska, Kansas, North and South Dakota and parts of Oklahoma, New Mexico and Utah, and was also during this latter period an Engineer in the United States Reclamation Service in charge of surveys, designs and estimates of costs for a 60,000 acre reclamation project in Southern Colorado and Northern New Mexico. From 1906 to 1907, I was engineer in charge of surveys, location and construction of a 28,000 H. P. Hydro-electric development on the Colorado River, near Glenwood Springs, Colorado, which development involved the location and construction of about two miles of tunnel, and expenditure of several millions (684) of dollars. I assisted in the design of the Redlands Power [fol. 570] Plant at Grand Junction, Colorado, in 1907 to 1908, which pumps water from the Gunnison River for the irrigation of between four and five thousand acres of land.

From 1908 to 1910, I was resident engineer for the Orchard Construction Company of Chicago, during which time I made complete surveys for the largest pumping plant in Colorado, which delivered water for the irrigation of about 10,000 acres of land near Grand Junction, Colorado and which development cost about one million dollars. • • •

From 1910 to 1912, I • • • constructed one of the largest underflow collecting water systems for the irrigation of 10,000 acres of land near Tucson, Arizona and this project cost about one million dollars. I was also associated with a former partner in the construction of a hydraulic fill dam on the Alamosa River in Colorado, which at that time was one of the highest hydraulic fill dams in the United States. • • • From 1912 to 1914, I was in charge of construction of the Beaver Park dam in Southern Colorado; • • • From 1914 to 1917, I was in general practice as a civil and irrigation engineer • • • and during this period I made investigations for and reports upon the water supply for an irrigation project for the Terra Bella Irrigation District at Terra Bella, California. From 1917 to 1918, I was in charge of the construction of a large irrigation dam across (685) the Colorado River in Arizona. The following year I was engaged in investigating and reporting on an irrigation system in Northern New Mexico, and from 1919 to 1923, I made • • • investigation of and designs for numerous dams, and reports on irrigation projects and water supply.

Since November 30, 1923, I have held the position of State Engineer of Colorado. The State Engineer has general supervision over the distribution of public water supplies of the State, and over the administration of approxi- [fol. 571] mately 18,000 priorities supplying water to substantially 3,500,000 acres of land for irrigation purposes. He also has direct charge of the design, supervision and construction of all dams in Colorado more than ten feet in height • • • of which there are more than one thousand such dams in this state. He also has charge of all hydrographic investigations in the State, and maintains some 135 stream gaging stations for that purpose. He is Chairman of the State Irrigation District Commission, Secretary-Treasurer of the State Board of Examiners for Engineers (686) and Land Surveyors, and is the offi-

cial charged with the duty of administering all interstate stream compacts.

As State Engineer of Colorado, I am familiar with the laws respecting ownership and use of the public water supply of the State from an administration point of view * * * With respect to the natural water supplies of the State, Sections 5, 6 and 7 of Article XVI, of the State Constitution declare that the water of every natural stream, not heretofore appropriated, within the State of Colorado, is hereby declared to be the property of the public, and dedicated to the use of the people of the State, subject to appropriation as thereinafter provided. * * * Priority of appropriation gives the better right as between those using the water for the same purposes, and when the water of any natural stream is not sufficient for the service of all those desiring the use of same, those using the water for domestic purposes shall have the preference over those claiming for other purposes and those using the water for agricultural purposes shall have the preference over those using the same for manufacturing purposes.

It is further provided that the right of way across public [fol. 572] or private lands shall be given for construction of ditches, canals and flumes to convey water for agricultural purposes, domestic, mining and manufacturing, and for drainage, (687) upon the payment of just compensation.

In 1879, the Legislature first provided the methods of procedure for determining relative claims to the use of the unappropriated water supplies of the State, and made provision for the creation of water districts and the office of Water Commissioner. The District Courts were given authority to take evidence and render decisions in the nature of decrees establishing the quantity of water to which a claimant is entitled, the date of priority and the purpose for which the water shall be used. For the purpose of protecting the appropriators and to determine their rights as determined by the courts, the Legislature in 1879 provided for the creation of water districts (688) as well as the office of Water Commissioner, whose duty it is to administer and account for the distribution of water in his district according to priority established pursuant to decree of court and to protect all appropriators in their established claims. Thereafter, in 1881, the Legislature created the office of

State Engineer, giving that official supervision over all Water Commissioners of the State. In 1887, the Legislature created irrigation divisions, which embraced the lands irrigated in the several drainage systems of the State. There are seven irrigation divisions and 69 water districts in Colorado, and the Administrative Department of the State Engineer consists of a State Engineer, six irrigation division engineers, sixty water commissioners, and a similar number of deputy water commissioners.

Irrigation Division No. 1 consists of all the land irrigated [fol. 573] by water from the South Platte River, the North Platte River, the Big Laramie and the North and Middle Forks of the Republic River, Sandy and Frenchman Creeks, and the streams draining (689) into the said rivers and creeks. In this irrigation division district are 14 water districts, consisting of Water Districts Nos. 1 to 9, inclusive, 23, 47, 48, 64 and 65. Water District No. 3 comprises all the lands irrigated from the Cache la Poudre River and its tributaries. Water District No. 47 embraces all the lands in Colorado irrigated by the North Platte River and tributaries. Water District No. 48 comprises lands in Colorado irrigated from the Big Laramie River and its tributaries. The Water Commissioner has direct supervision over the administration of all the decreed waters of his district, the distribution, storage and accounting for such waters in accordance with court decrees. He reports directly to the Irrigation Division Engineer, who in turn reports to the State Engineer.

In 1929, the Legislature abolished the office of Irrigation Division Engineer of Division No. 1, and turned the duties of such office over to the State Engineer. The Irrigation Division Engineer, or his equivalent, maintains a register of all court decrees in his irrigation division, and is required to administer the same in order of priority, regardless of the geographical location of the water rights in such division. (690) From information which he obtains through the Water Commissioners with respect to the needs of water to satisfy any shortage in his district the division engineer causes water to be turned down from upper districts along the main stream system to fill the requirements of more senior priorities in the lower reaches of his division, and when such senior decrees have been satisfied the division engineer issues orders for the next junior rights to again

[fol. 574] divert water in accordance with the court decree. (690) Appeals from decisions of a Water Commissioner go direct to the Division Engineer and thence to the State Engineer, whose decision is final, except it is subject to review by the courts. When needful for the protection of all decreed rights to the use of water, the owner of a ditch, or canal diverting water from a natural stream in the State is required to install a suitable measuring device at the direction of the State Engineer, and which thereafter may not be adjusted or interfered with by the owner of the ditch or canal, except with the consent of the water officials. The State Engineer also has authority to limit (691) the stage of storage in reservoirs the dams of which are more than 10 feet in height as a matter of safety. As a preliminary to the distribution of the water supplies of the State to the various decreed ditches and reservoirs, it is necessary to first determine the amount of water in the streams available for distribution. To do this, it is necessary to maintain measurements of stream flow, and to rate and measure from time to time carrying capacities of the canals and ditches involved. These measurements are made by Hydrographers using current meters and rectangular rating flumes, and more recently by the use of the "Parshall" type of rating flume, which had been developed in the United States Hydraulic Laboratory at the State Agricultural College at Fort Collins by Mr. R. L. Parshall, Senior Irrigation Engineer of the United States Department of Agriculture.

The State of Colorado employs five hydrographers and one chief hydrographer, who is responsible for the rating or measurements of the ditches, canals and natural streams of the State. There are also something like 250 automatic recording devices installed on canals and ditches, and about [fol. 575] 135 stream gaging stations in Colorado which are equipped with automatic registering devices.

(692) We follow the same methods in making determinations of stream flow and ditch measurements as are employed by the Water Resources Branch of the United States Geological Survey.

In certain localities in the State, where the water supply in general is adequate for the irrigation of all lands from such streams, very little supervision by water officials is required and hence there is no need for the maintenance of measuring devices as in other localities where the avail-

able water supply is scarcely ever adequate to meet the demands, such as is the case in Water District No. 3, embracing the Poudre River Drainage Basin. Generally localities requiring but minor administration of the decrees are found at the higher altitudes of from about 8,000 to 9,000 feet or more above sea level where nothing but native grasses requiring the application of water are produced; due to climatic conditions which prevail in these higher altitudes of the state, and the character of crops that can be grown therein, the need for an accurate and continuous administration of the water decrees is not as necessary as in the lower altitudes of the state where a more intensified type of agriculture prevails.

The system of water administration in Colorado is quite intricate, and has been so highly developed and systematized that it has come to be recognized as one of the most outstanding systems of administration of public water supplies in any State in the Union. During each irrigation season [fol. 576] the water that is administered in this State has a value of approximately thirty million of dollars.

The official unit of measure of running water is the cubic foot per second of time, and for water which is impounded in reservoirs the unit is the cubic foot or acre foot, which is equivalent to 43,560 cubic feet. The Court Decree specifies the amount of water which may be diverted in cubic feet per second of time, commonly called "second feet," while decrees for storage purposes usually designate the amount of water in cubic feet or acre feet, and usually limit the rate of diversion from the natural stream to a certain number of cubic feet per second of time. Under the laws of Colorado, a water right is not an appurtenance of the land and may be sold and taken away or transferred from one ditch to another, with the sanction of the court which originally adjudicated such water right.

The Water Commissioners are required to keep a record of the amount of land irrigated in their water district, the character and acreage of crops grown, and in general the total amount of water distributed in their district each year for various uses. These records are tabulated and filed in the office of the State Engineer for permanent record.

I have in connection with my official duties had occasion to make observations of a general nature of the topographical and geological features of the Laramie River Basin in

Colorado. The land irrigated by the water taken from the Big Laramie River and its tributaries in Colorado lies adjacent to such streams and is generally quite uniform as to [fol. 577] topography having a gentle slope generally parallel with the stream, and more pronounced transversely towards the stream. A comparatively small percentage of the irrigated land is located at a somewhat higher elevation than the main valley floor upon adjacent mesas where the drainage from such lands to the streams is quite pronounced. All of these lands irrigated by the Big Laramie River and its tributaries in Colorado are within an enclosed basin, the only natural outlet from which, is through the channel of the Big Laramie River, where the same flows across (695) the Colorado-Wyoming State line thru narrow canons.

Except for the trans-mountain diversions in Colorado, no part of the water diverted for the irrigation of the meadow lands in Colorado can escape outside of the Basin, except through the channel of the Big Laramie River, where the same flows across the Colorado-Wyoming State line.

The general altitude of the irrigated areas in Colorado in this Basin ranges from about 7600 to 8500 feet above sea level. The soil consists of a light covering of sandy mountain loam, usually but a few inches to approximately two feet in depth, overlying a coarse sub-formation of a gravelly character. The soil is quite porous, and as a result any water applied to it has a rather free return under the action of gravity back to the stream from which the water was taken. The ordinary irrigation period in this Basin covers about sixty to seventy days, extending from about May 15th to about August 1st, the practice being to turn the water off the irrigated meadow lands about July 15th to 20th, in order that the soil may become sufficiently drained to permit the harvesting of the hay crop. These lands are found in Water District No. 48. There are on file in the State En- [fol. 578] gineer's office a list of water decrees, covering the ditches and reservoirs in Water District No. 48, and I have computed the amount of water decreed by (696) the Colorado Courts to such ditches and reservoirs.

By the Courts of Colorado, there has been decreed to the ditches and reservoirs in this Basin a total of 2,326.68 cubic feet per second of time, of which 1,474.72 cubic feet per second of time are in the form of absolute decrees, while

851.96 cubic feet per second of time are in the nature of conditional decrees. Of the 1,474.72 second feet, 338.48 are decreed from Sand Creek, or Deadman Creek to the Wilson Supply System. Since the irrigation season, in the Big Laramie River Basin in Colorado ordinarily covers extends from sixty to seventy days, the water to which these ditches in water District No. 48 would be entitled to divert Water District No. 48, for diversion, under their absolute decree during that period, would be from about 136,350 to about 159,000 acre feet, and during the same period of time these same ditches would be entitled to divert from about 102,240 to about 119,280 acre feet under their condition decrees. (See Folio 1830.)

The complainant states that according to the records of the Water Commissioner of District No. 48, there has been diverted as much as 61,767 acre feet in a single year by the ditches in that district, from which statement it appears that these ditches in Water District No. 48 have never exceeded the amount (697) which they are entitled to divert under their decreed appropriations made by the Courts of Colorado.

There are a comparatively large number of conditional decrees in District No. 48 for storage water in reservoirs according to the records in the State Engineer's office.

In connection with the ditches making trans-mountain diversions of water from the Laramie River Basin in Colorado to the Cache la Poudre River Basin, I have personal knowledge of what is known as the West Side Collection [fol. 579] Ditch, which collects water diverted through the Laramie-Poudre Tunnel and also the Skyline Ditch, which is otherwise known as the Laramie River Ditch. I have never made an investigation on the ground of any part of the Wilson Supply or Sand Creek System, nor what is designated as the Bob Creek and Columbine Ditches. I do know however from the records in my office that such ditches do exist and also know that the owner of the Skyline Ditch is The Water Supply and Storage Company, which is incorporated under the laws of Colorado and has its principal place of business at Fort Collins, Colorado.

The Water Supply and Storage Company owns and operates as part of its irrigation system: The Skyline or the Laramie River Ditch, which heads on the West Fork of the

Big Laramie River in Colorado, and diverts water from the said West Fork of the Big Laramie River in Colorado, and also from several small tributaries thereof. This ditch extends in a southerly course along the slopes of the mountains for a distance of about seven miles at which point the Skyline Ditch crosses a natural divide between the headwaters of the Big Laramie and the Cache la Poudre River.

The Skyline Ditch has a Decree for 400 cu. feet per second of time with priority as of August 7, 1891, and delivers water into a tributary of the Cache la Poudre River and thence into and through Chambers Lake, which is a natural Lake in which the Cache la Poudre has its source.

The Water Supply and Storage Company re-diverts waters delivered by the Skyline Ditch, together with other waters naturally occurring in the Cache la Poudre River Basin, through what is known as the Larimer County Ditch, which heads on the North bank of the Cache la Poudre River about 10 miles West of the City of Fort Collins. The Larimer County ditch then extends in a general Easterly direction for a distance of about 40 miles as measured along its [fol. 580] meanderings, and irrigates approximately 52,000 acres of land in Larimer and Weld Counties.

(699) The Larimer County Ditch serves also as a ditch to store water in a system of reservoirs owned by the Water Supply and Storage Company which are known as Curtis Lake, Richards Lake, Rocky Ridge Reservoir and Reservoir numbers 2, 3 and 4, Long Pond, Lindermeir Lake and Black Hollow Reservoir. The Water Supply and Storage Company also owns Chambers Lake, a decreed reservoir, and Grand River Reservior, commonly known as Long Draw Reservoir, which is fully constructed to a capacity of 191,671,740 cubic feet, for which no decree has yet been entered. The total decreed capacities of the aforementioned lakes and reservoirs are about 1,200,000,000 cubic feet.

The lands served by the system of the Water Supply and Storage Company are in a high state of cultivation, and are classed among the most productive lands in Northern Colorado. The principal crops grown are alfalfa, sugar beets, potatoes and grains. Root crops, such as sugar beets and potatoes, (700) require water for late irrigation up to approximately September 1st to 10th.

The production of sugar beets along this canal system will average about 15 tons per acre per year and potatoes aver-

age from 100 to 125 bushels per acre per year. Alfalfa usually produces three crops, making approximately a total of 2½ tons per acre. This crop is used largely in the feeding of livestock in the vicinity of Fort Collins, which also consumes large quantities of sugar beet pulp from the local beet sugar factories. The general territory in this section fur- [fol. 581] nishes for the market approximately one million fat lambs each year, besides large numbers of cattle. This area is the largest lamb feeding section of the United States. In addition to the aforementioned canal and reservoir units owned by the Water Supply and Storage Company, it is also the owner of what is known as the Laramie, Lost and Lilly Lakes, which are natural mountain lakes located on the top of the Divide separating the drainage basin of the Big Laramie River and the Cache la Poudre River. The capacity of these three lakes is about 808 acre feet. The works of the Water Supply and Storage Company are of a very substantial nature and have been in operation for many years. The company is (701) considered to be one of the most stable irrigation companies in Northern Colorado. As I have heretofore testified the West Side Ditch and the Laramie Poudre Tunnel are owned by the Laramie-Poudre Irrigation Company. This company owns the Laramie Poudre Tunnel system, consisting of the Laramie-Poudre Tunnel, The West Side Collection Ditch and the Link Lakes Reservoir system, consisting of 14 natural lakes, located high up on the West slope of the drainage basin of the Big Laramie River in Colorado. From these sources waters are diverted from Rawah Creek and the West Fork of the Laramie River, and through small tributaries thereof into the channel of the Big Laramie River, which waters are delivered into the West Portal of the Laramie-Poudre Tunnel. In addition to the above named works the Laramie-Poudre Irrigation Company owns the uncompleted East Side Collection Ditch which taps Deadman, and Nunn Creeks and other tributaries entering the Big Laramie River from the East. The West Side Collection Ditch is completed from Rawah Creek, a tributary of the Big [fol. 582] Laramie River in Colorado, to the West portal of the Laramie River Tunnel. The water conveyed through this tunnel into the Cache la Poudre River is re-diverted at a point on the North bank of the Cache la Poudre River, ap-

proximately 14 miles West of the City of Fort Collins, through what is known as the Poudre Valley Canal.

(702) This canal extends in an Easterly direction for a distance of approximately 120 miles. This system originally was designed to irrigate about 125,000 acres of land, but due to the limitations placed upon the right of this system to divert water from the Big Laramie River in Colorado by the decree of the United States Supreme Court, the area is now reduced to about fifty thousand acres. The lands covered by this irrigation system are adjacent to and quite similar in character to those served by the system of the Water Supply and Storage Company. The Laramie-Poudre Irrigation Company also owns what are known as Dowdy, Snake, Twin, Erie, Mitchell, Douglas and Cobb Lakes, and also reservoirs numbers 1, 2, 3 and 4, all of which are decreed reservoirs used for the storage of water when the same is available.

Water Commissioners in Colorado are not authorized by law to make ditch ratings and measurements of water diverted by irrigation ditches. These officers determine the amount of water diverted by a ditch from an official rating card or rating table which he obtains from the office of the State (703) Engineer or the Irrigation division Engineer. If he should not be furnished with such rating table, it is not possible for him to accurately determine the amounts of water diverted from the natural water supplies [fol. 583] of the State. If a Water Commissioner has no official rating card, the record of any appropriated diversions made by him would be mere estimates and would have to be accepted as such. No water user, owner, superintendent of canals or ditches or reservoirs has any authority to make official determination, under the law, of the amount of water diverted by the owner of the canal, unless he is deputized by the State Engineer to perform such service. The Water Commissioner may be deputized by the State Engineer to make current meter measurements and rating tables showing the carrying capacity of a canal or ditch, and from such rating tables may make determinations of the water carried daily by a ditch or canal when so authorized.

The Water Commissioner of Water District No. 3, William (740) J. McAnelly, has been deputized by the State Engineer, and has authority since 1922 to make of-

ficial rating tables. He was originally deputized on May 11, 1922, by Mr. A. J. McCune, former State Engineer. I have examined the records of the State Engineer's office and found that Mr. McAnelly's authority in this respect has not been revoked. It is my understanding that Mr. McAnelly, Water Commissioner of District No. 3, attended the State Agricultural College at Fort Collins, Colorado, for a period of three years, taking engineering courses, and since 1921 has (705) been Water Commissioner of that district. He is a registered engineer and qualified to practice the profession of civil engineer under the laws of this state and I consider him qualified to make these various determinations and to make measurements and determine the amounts of water diverted by a canal or ditch. The other Water District in addition to Water District No. 3, which is immediately concerned in this controversy [fol. 584] between the States of Wyoming and Colorado, is Water District No. 48. The duties of the Water Commissioner in District No. 3 are probably the most exacting and important of any of the Water Commissioners in the State of Colorado, due to the very complex system of the exchange of water between ditches and canals and the Cache la Poudre River, and the trans-mountain diversions of water from other drainage basins into the Cache la Poudre River Basin. By trans-mountain diversions, I mean the water (706) brought into the Cache la Poudre River Basin from outside or from other stream basins, such as the Laramie, Colorado River and North Platte River Basins.

It is necessary, under the laws of Colorado, for our Water officials to make an accounting of such trans-mountain diversions in order to protect those making such diversions so that they may take out of the Cache la Poudre River the proper amount of water and also in order that the appropriators of water originating in the Cache la Poudre River Basin may be protected against excessive or illegal diversions from the Cache la Poudre River by those making such trans-mountain diversions. In other words, an erroneous accounting of the water turned into the Cache la Poudre River Basin from the Laramie River in Colorado, or from the Colorado River Basin, would result in controversies between those making such trans-

mountain diversions and the appropriators of water out of the Cache la Poudre River and tributaries thereof. If a lesser quantity of water were turned into the Cache la Poudre Basin than the reported amount, it would (707) have the effect of depriving the appropriators of water in the Cache la Poudre River of their property rights, while on the other hand the owners of trans-mountain diversions are just as diligent to be credited by the water officials with all the water they turn into the Cache la Poudre River from other drainage basins, so that they may divert from the Cache la Poudre River in return an equivalent, or proper amount of water.

[fol. 585] The appropriators constantly watch each other to see that the trans-mountain diversions are properly accounted for, and continually watch the water officials having charge of the administration of such trans-mountain diversions, and they naturally insist that the measuring and recording devices should be adequate and efficient and the records kept accurately.

(708) During the time that I have been State Engineer, between 9 and 10 years, I do not recall that I have ever received any complaints from the owners of ditches having appropriations of water from the Cache la Poudre River, with respect to the accuracy and efficiency of the devices installed for measuring water diverted from the Laramie to the Cache la Poudre River. Nor do I recall any complaint in this respect made by other Colorado water users whose interests would be adversely affected as the result of inadequate and inaccurate measuring equipment for measuring the quantity of water diverted from the Laramie to the Cache la Poudre River. The absence of complaints would seem to be adequate proof of the sufficiency of such measuring devices. All water users from the streams of Eastern Colorado, are very zealous in protecting their rights and in obtaining all the water to which they are entitled under their decreed priorities as against improper diversions by other ditches.

(709) I received a letter from Mr. Whiting, State Engineer of Wyoming, dated March 8, 1928, suggesting that the waters of the Big Laramie River be inventoried. The letter to which I refer is Complainant's Exhibit 22, and from examination of it I consider that no request to install measuring devices was made by Mr. Whiting in the letter of

March 8, 1928. The letter refers primarily to an inventory [fol. 586] of the water resources of the Laramie River, and to an accounting of the water taken thru trans-mountain diversions out of the Big Laramie River into the Cache la Poudre River.

With respect to the matters suggested in complainant's Exhibit No. 22, Colorado's position has never been antagonistic (710) to any joint investigation by the State of Wyoming and the State of Colorado, for the purpose of determining the amount of water diverted out of the Big Laramie Basin into the Cache la Poudre River Basin.

I replied to Mr. Whiting's letter of March 8th, under date of April 5th, 1928, which has heretofore been introduced as Complainant's Exhibit No. 30, and in which it was certainly farthest from my idea to deny the request of Mr. Whiting made on behalf of the State of Wyoming. Following the receipt of the above letter from Mr. Whiting, suggesting an inventory of the waters diverted by Colorado from the Laramie River, I wrote to the representatives of the owners of the ditches diverting water out of the Big Laramie River into the Cache la Poudre, advising them of Wyoming's request, and asked them to advise me of their position in respect thereto. On March 12, 1928, I wrote to Mr. Whiting advising him of this action, which letter has been heretofore introduced as Complainant's Exhibit No. 31, and which letter is dated March 12, 1928, addressed to Honorable John A. Whiting, State Engineer of Wyoming, Cheyenne Wyoming, reading as follows:

Exhibit 31 omitted. Printed side page 1397 post.

[fol. 587] (712) Under date of latter part of February or forepart of March, 1928, I had a conversation with Mr. Whiting, State Engineer of Wyoming in which he mentioned to me the desirability of making measurements on trans-mountain diversions made from the Big Laramie River Basin to the Cache la Poudre River Basin in Colorado, and asked permission to make such measurements and install his own measuring devices. At that time I told him that we had no objection whatsoever to his making such measurements, or going over any particular measuring devices and recording devices, but we did not feel it would be desirable to have Wyoming install duplicate measurement devices and recorders, as he had requested orally to

do, because it would result in a duplicate record which could not under any conceivable conditions agree with one another and hence would lead to more or less confusion between the two states. That (713) was the basis for my objection to the request to install additional measuring devices by the State of Wyoming. I agreed with the other portion of the request that he made at that time. Feeling that this oral request was a matter in which the owners of the trans-mountain diversion works were vitally interested, I wrote to the owners of such diversion works to get their reaction as to Mr. Whiting's request. I wrote under date [fol. 588] of March 7, 1928, to Mr. A. C. Kluver, Water Supply and Storage Company, Fort Collins, Colorado, and also to Mr. Roy Portner, Fort Collins, Bruce Eaton, Eaton, Colorado, (714) and H. D. Parker, Greeley, Colorado.

The letter mailed to each of these parties is introduced in evidence as Defendant's Exhibit "B" and reads as follows:

Exhibit B omitted. Printed side page 2674 post.

[fol. 589] (716) I received replies to that letter, one of which is marked Defendant's Exhibit "C", which is a letter addressed to M. C. Hinderlider, Denver, Colorado and signed by L. R. Temple, under date of March 13, 1928, reading:

Exhibit "C" omitted. Printed side page 2675 post.

Defendant's Exhibit "D" marked for identification is a letter addressed to Hon. M. C. Hinderlider, State Engineer, Denver, Colorado, under date of March 16, 1928, and signed by The Laramie-Poudre Irrigation Company, by H. D. Parker, President.

(Defendant's Exhibit "D" offered in evidence.)

[fol. 590] Exhibit "D" omitted. Printed side page 2676 post.

[fol. 591] (Defendant's Exhibit "E" marked for identification.)

This Exhibit is a letter signed by Mr. Rex C. Eaton, dated March 24, 1928, and addressed to me as State Engineer, which I received through the regular channels of the mail.

Defendant's Exhibit "E" is offered in evidence and reads as follows:

Exhibit E omitted. Printed side page 2677 post.

[fol. 592] (723) I do not recall that I received a reply to the letter addressed by me to Mr. Portner, of Fort Collins, in response to my letter of March 7, 1928, which is Defendant's Exhibit "B". Thereafter I received a further communication from Mr. Whiting on March 8th, 1928, which is a letter introduced here as Complainant's Exhibit No. 22, and which reads as follows:

Exhibit 22 omitted. Printed side page 1385 post.

[fol. 593] Previous to the receipt of this letter of March 8th, 1928 I had already taken up the matter with the water users in Northern Colorado as a result of Mr. Whiting's conversation had with me some days prior to March 7, 1928. My reply to this letter of March 8, 1928, has already been introduced herein as complainant's Exhibit 31, at folio 711. (726) After receiving replies from the water users with respect to the suggestions made in the letter addressed to me by State Engineer Whiting, of Wyoming, I wrote Mr. Whiting under date of March 26, 1928, copy of which letter has heretofore been marked Exhibit No. "23" and reads as follows:

Exhibit 23 omitted. Printed side page 1386 post.

[fol. 594] (727) Thereafter I received a reply to that letter from the State Engineer, of Wyoming, on or about March 31, 1928, which reply has heretofore been introduced as Complainant's Exhibit 24 and which reads as follows:

Exhibit 24 omitted. Printed side page 1387 post.

[fol. 595] (730) I thereafter made on or about April 2d, 1928 reply to this letter of Mr. Whiting's dated March 31, 1928, which has heretofore been introduced as Complainant's Exhibit No. 25, and which reads as follows:

Exhibit 25 omitted. Printed side page 1389 post.

[fol. 596] Thereafter on or about April 3, 1928, I received a reply to my letter from Mr. Whiting, which has heretofore been marked Complainant's Exhibit No. 26, and reads as follows:

Exhibit 26 omitted. Printed side page 1390 post.

[fol. 597] As a result of this correspondence and my suggestions, the meeting of the water users diverting water from the Laramie River was held in the State Engineer's office of Colorado on or about April 5, 1928.

There were present at this meeting, Mr. A. C. Kluver, Mr. L. R. Temple, President and attorney, respectively, [fol. 598] of the Water Supply and Storage Company, H. D. Parker, President of the Laramie-Poudre Irrigation Company, Rex B. Eaton, representing the Wilson Supply System; Roy Portner, and his associate, Mr. Schureman, representing the Bob Creek (734) and Columbine Ditches; Delph E. Carpenter, at that time Interstate Streams Commissioner for Colorado; Robert Follansbee, District Engineer of the United States Geological Survey, and myself.

Although his name does not appear on the data from my daily diary, yet it is very likely that Mr. Kelly, Attorney for the Laramie Poudre Irrigation Company, was also present. There were one or two other water users, representing appropriators out of the Cache la Poudre River, present at the said meeting, but I do not now recall the names of the parties. I had invited Mr. Whiting, State Engineer of Wyoming, to be present but he did not come. At this meeting held in the office of the State Engineer in Colorado on April 5, 1928, Mr. Follansbee, of the United States Geological Survey, presented a plan at the (735) request of the water users of Colorado looking toward a joint inventory of the water diverted from the Laramie River into the Poudre River, and he proposed that his department, he being the District Engineer of United States Geological Survey, situated at Denver, Colorado, should install all measuring devices consisting of measuring flumes and automatic registers and make all the discharge measurements and compute the amount of water diverted by the ditches and tunnel in question and furnish the States of Colorado and Wyoming duplicates of all records obtained by him without cost to the United States Geological Survey. This plan was not satisfactory to the owners of the Colorado ditches and tunnels; they objected on the ground [fol. 599] generally that they were interested in the water supplies originating in the Cache la Poudre River Basin, as well as water which they were diverting from the Laramie River Basin; that the water diverted from the Laramie River Basin is mingled with the water naturally rising in

the Cache la Poudre River Basin, and as a result of such mingling of the waters, their interests would be directly affected by any measurements or inventory of such water supplies being diverted from the Laramie River Basin by any outside agency, such as the United States Geological Survey, and that such plan or dual measurements by the State Engineer of the waters originating in the Cache la Poudre River Basin and the Laramie River waters, and by the United States Geological Survey, would lead to confusion and legal conflicts among the water users, since they would be bound by the State Engineer's office with respect to measurements of the Cache la Poudre River diversions, and determinations made by him and by the United States Geological Survey with respect to trans-mountain diversions from the Laramie River to the Cache la Poudre River. (736) At this meeting on April 5, 1928, there was no objection made by the representatives of the water users present to a joint investigation and inventory between Colorado and Wyoming of the water being diverted from the Laramie River into the Cache la Poudre River.

With respect to the suggestions made by Mr. Follansbee, the representatives of the water users present at that meeting offered an alternative plan to the effect that they welcomed a joint investigation by the State Engineers of Wyoming and Colorado, and the measurement of such trans-mountain diversions, in order that Wyoming might be fully [fol. 600] satisfied and protected (737) in her rights. They did not think, however, that the State Engineer of Colorado and of Wyoming, had any authority to ascertain the legal quantity of water to which each trans-mountain diversion and appropriator is entitled, as proposed in Mr. Whiting's letter of March 8, 1928, for the reason that they did not consider that their individual amounts of water had been fixed by the decree of the United States Supreme Court; neither did they feel that it was at all needful to call any outside agency in, such as the United States Geological Survey, to make a determination of equities between the states. They proposed in turn that the State Engineer of Wyoming, in company with the State Engineer of Colorado, should inspect all measuring devices and equipment then in use to measure and record water diverted from the Laramie River to the Cache la Poudre River, and that following such investigations the owners of such works would make such

improvements as the State Engineer of Wyoming might feel necessary to have made in order to provide proper safe-guards to Wyoming's interests.

When such measuring devices had been approved by the State Engineers of both States, then such State Engineers would jointly make measurements of the water diverted from the Laramie River into the Cache la Poudre, and that Wyoming should at all times have free access to all such equipment, automatic registers and records obtained from such registers, and that there should be an exchange of all such data collected by the State Engineers of Wyoming and Colorado; that it would be impracticable to maintain duplicate measuring devices, such as had been previously suggested and requested by the State Engineer of Wyoming [fol. 601] in verbal conversations between Mr. Whiting and myself, since no two sets of records obtained from two independent measuring devices would agree; and such condition would only provide grounds for disagreement (738) between the two States in question. The representatives of the ditches and tunnel expressed a most earnest desire at the meeting on April 5, 1928, to satisfy Wyoming with respect to the measurements and inventory of the water diverted from the Laramie River and to assure Wyoming of their wish to cooperate to such ends.

Immediately following the meeting on April 5th, 1928, I wrote Mr. Whiting advising him of the results of the meeting held on that date in my office and which letter has heretofore been introduced as complainant's Exhibit 30 and reads as follows:

Exhibit 30 omitted. Printed side page 1395 post.

[fol. 602] I feel that the plan for joint inventory and accounting of the waters diverted from the Laramie Poudre River would be entirely practicable if made jointly by the State Engineers of Colorado and Wyoming.

My position in this respect was based first upon the reasons heretofore assigned by the owners of such diversion works, and, second, as a result of my experience in administering interstate river compacts between the States of Colorado, Nebraska and New Mexico, which under the law I am charged with administering.

The South Platte River Compact betwe-n Colorado and Nebraska was concluded in 1923, and the La Plata River

Compact between Colorado and New Mexico was concluded [fol. 603] in 1922. These two interstate river compacts did not provide for any agency for the administration of the same other than the State Engineers.

(741) It is my understanding that the State officials charged with the duty of drafting these compacts definitely recognized the undesirability, and even danger of clothing any Federal agency with power to administer such compacts, or with power to make any determination affecting the relative rights of the States thereunder. It was with this idea in mind that these compacts provided for the determination of the amounts of water required to be delivered by Colorado to Nebraska and New Mexico, under the provisions of the Compacts and that such determinations should be made by the State Engineers of these interested states. As State Engineer I have administered these compacts on behalf of Colorado since the same have been in operation and during all of that time no material question has arisen relative to the accuracy of the measuring devices (742) and the measurement of stream flow and ditch diversions between the office of the State Engineers of Colorado, Nebraska and New Mexico, and during all that time there has been reasonable harmony between the respective officers concerned.

Mr. Whiting, the State Engineer of Wyoming did not elect to accept the plan offered on the part of myself and the owners of trans-mountain ditches and tunnel diverting water out of the Laramie River to the Cache la Poudre River for investigating and making inventory of water so diverted, but Wyoming has asked in her second cause of action that she be permitted to install standard gaging devices and make any and all such records or measurements of water, and that such measuring devices be maintained and operated under the direction, authority and control of the Federal Government.

It is my understanding that the Ditch Companies, concerning which I have heretofore referred to are mutual or- [fol. 604] ganizations, and not organized for profit and that they are supported by yearly assessments upon the shares of stock ordinarily owned by mutual corporations.

In my previous testimony I omitted the names of two trans-mountain diversions, the ditches of which were owned by the (743) Water Supply and Storage Company, namely:

the Cameron Pass Ditch which diverts water out of a tributary of the North Platte River, and the Grand River Ditch, which diverts water out of the headwaters of the Colorado River. The latter ditch is about seven or eight miles long and diverts water out of what is known as Water District No. 51. The Cameron Pass Ditch diverts water out of what is known as Water District No. 47, and both into water district No. 3. I cannot say exactly without referring to the records of my office, but I should say the Cameron Pass Ditch diverts approximately from five to eight hundred acre feet of water per year, and the Grand River Ditch approximately from 13,000 acre feet per year, up to 16,000 acre feet per year.

The official records of the State Engineer's office, as furnished by the Water Commissioners consist of automatic register charts, which show the rise and fall of water in a rating flume in a ditch, together with discharge measurements made by current meter, and rating tables made by a Water Commissioner deputized by the State Engineer to make such meter measurements and such rating tables. Also the weekly reports furnished by a Water Commissioner.

(744) In general I have been familiar with the litigation that has been going on between Wyoming and Colorado, and also with the present water suit. I think the first decree handed down by the United States Supreme Court in the suit between Wyoming and Colorado was in June, 1922, which decree was later modified in October of that year and the ruling on motion to dismiss the present suit, as I recall, was about May, 1932.

(745) I am familiar with the terms and provision of the [fol. 605] original decree, but I would have to refresh my memory on the rulings of the court on *the* Colorado's motion to dismiss.

As an administrative officer my interpretation of the decree of the Supreme Court, particularly relating to the allocation of water, and the meadow land diversions, is that in the original decree, as well as in the amended decree, the Supreme Court allocated to Colorado a certain fixed quantity of water, which I considered as a mass allocation by means, consisting of the aggregate amount of 18,000 acre feet for the Skyline Ditch, 15,500 for the Laramie-Poudre Tunnel, and 4,250 acre feet for the meadow rights, making a

total of 37,750 acre feet, and also an unknown quantity, at this time designated, I believe, by the Supreme Court as that relatively small quantity of water appropriated prior to 1902 by and for the Wilson Supply System.

(746) I believe that Colorado is limited by the Supreme Court Decree to a total diversion in any one year to 37,750 acre feet to the above first three named agencies and that this mass allocation would permit, under my interpretation of the decree, a diversion by the Skyline, for instance, of a greater amount than 18,000 acre feet, or by the meadow rights of more than 4250 acre feet, if the diversion by the Laramie-Poudre Tunnel were less than 15,500 acre feet, so that the total diversions in any one year does not exceed 37,750 acre feet. In other words, this allocation of water was not made to these several State agencies, but to the State of Colorado, itself, for the enjoyment by its agencies or appropriators, under the laws of the State of Colorado.

With respect to the interpretation I have placed upon the decree, as an administrative officer, with respect to the 4250 acre feet allotment designated as meadow rights, I have al- [fol. 606] ways construed the intention of the court to mean a consumptive use. In other words, that Colorado ditches had the right under the court decree to consume out of the common supply of the Laramie River and its tributaries in any one (747) year 4,250 acre feet of water on the Meadow Lands. This does not mean by actual headgate measurement since it would be utterly impossible in my opinion to successfully irrigate 4,250 acres of wild meadow lands by the measurement of 4250 acre feet at the head of those ditches.

The diversions made by the Skyline and the Laramie-Poudre Tunnel, are in the nature of a consumptive use, depleting, as they do, the common water supply to the extent of the amount of water they divert out of the Laramie River Basin. With respect to the diversions by the so-called meadow rights, any consumed use of water resulting from the production of wild meadow hay, would be in the nature of consumptive use, and hence a depletion of the common water supply of the system. However, regardless of the amount of water which may be diverted through the heads of these ditches for the irrigation of these meadow lands, there is only a certain amount that is actually consumed. The balance which is diverted returns to the

stream system. Even though there were a larger amount diverted than 4,250 acre feet of water, that the Supreme Court decision authorized in such diversions, (748) so long as the stream is not depleted beyond 4,250 acre feet, it does not appear to us that Wyoming has cause for complaint.

In the language of the decree, as I recall, the court uses the words "divert and take," and I have always construed the word "take" to mean "to consume", so far as its effect upon (749) the State of Wyoming is concerned.

I have always considered that it was the duty of myself [fol. 607] and all water officials of Colorado to obey strictly the provisions of the United States Supreme Court Decree, and I have endeavored to enforce the same in all particulars.

I have heretofore testified that as State Engineer of Colorado, I have under my supervision and administration (750) more than 18,000 water priorities, as entered by the decrees of the Courts of Colorado.

In administering these priorities, differences of opinion arise and in such case it is my duty as State Engineer, to interpret the provisions of such decrees as the officer charged with the administration of the court decrees and to make a ruling in accordance with the terms of the decree itself. From my interpretation of the decree of course the parties interested may have the matter passed upon by the Courts.

(751) As an administrative officer, I base my interpretation of the decree of the United States Supreme Court upon the theory that the case in question is between states, in which the Court determined the relative equities in the water supplies of the Big Laramie River and its tributaries and that with the exception of the Laramie-Poudre Tunnel no limitation was intended to be fixed by the court as to the quantity of water which might be consumed or taken out of the Laramie River Basin in any one year, so long as the sum total of such depletions did not exceed the amount of 37,750 acre feet in any one year, exclusive of that relatively small amount of water appropriated by the Wilson Supply Creek from Deadman Creek, prior to 1902. [fol. 608] Under the law of Colorado, the Attorney General is made the official adviser of the State Engineer, as well as other state officials. Following the complaint from

Wyoming alleging that Colorado was violating the provisions of the Supreme Court Decree, I frequently sought the advice of the Attorney General of Colorado with respect to the proper interpretation of the Decree of the United States Supreme (752) Court. These opinions were verbal. Since the decision of the United States Supreme Court in the Wyoming-Colorado suit, there has been several individuals who have served as Attorney General in Colorado, and whose opinions have been sought and expressed to me with respect to the interpretation of that decree. The present Attorney General, Paul P. Prosser was preceded in office by Clarence L. Ireland, who in turn was preceded by John S. Underwood and he in turn by Robert E. Winbourn. I have had conferences with each with respect to the interpretation of the decree of the United States Supreme Court in regard to the allocation of water for the use of Colorado appropriators.

(753) I have also frequently consulted with the Assistant Attorney General having immediate charge of water litigation.

In view of my interpretation which as an administrative officer of the State I place upon the decree, and also that of the Attorney General of Colorado, as I understand his construction to be, I considered that I was at all times obeying the provisions of that decree, except that in the year 1929, it appears that I failed inadvertently to limit the total diversions for uses of water out of the Big Laramie River Basin in Colorado to 37,750 acre feet. This excess use amounted to between two and three per cent. The exact amount is dependent upon the result of a critical analysis which we are now making of such uses.

(754) I consider the Supreme Court Decree as being the [fol. 609] supreme law of the land and that it was not only my duty to obey the same, but it has been at all times my desire to do so and it is certainly my intention to obey that decree in all particulars now and in the future.

I have heretofore testified that districts Nos. 48 and 3 were districts immediately affected by the terms of the decree. District No. 48 comprises all the land irrigated by waters diverted out of the Big Laramie River and its tributaries, and District No. 3 comprises all land irrigated by waters diverted out of the Cache la Poudre River and its tributaries.

The Canals which divert water out of the Cache la Poudre
(755) River, including *which* water turned into the Cache la Poudre River by diversions from the trans-mountain diversions out of the Big Laramie River and its tributaries, consist of what are known as the Larimer County Ditch, owned by the Water Supply and Storage Company, which is also owner of the Skyline Ditch, the Poudre Valley Ditch, owned or controlled by the Laramie-Poudre Irrigation Company, and the Larimer and Weld Canal, which I believe takes water from the Wilson Supply or Sand Creek System. Also the Skyline or the Laramie River Ditch, the West Side Collection Ditch, which serves the Laramie Poudre Tunnel and the Wilson Supply System which consists of the Divide Ditch and Deadman Feeder Ditches; also the Bob Creek and Columbine Ditches. All of these canals and ditches have measuring devices for determining the amount of water diverted.

What is referred to as the Meadow lands lie in Water District No. 48. The ditches which serve the meadow lands, are equipped with measuring devices only in a very few instance-.

(756) The principal reason which makes it unnecessary to [fol. 610] have such measuring devices for the meadow land ditches, is that Colorado considered the water used by such meadow land ditches in the nature of a consumptive use; that regardless of the amount of water which may be diverted by the ditch owners for the irrigation of such meadow lands, by far the greater part of the amount so diverted, returns to the stream, and, further, that the peculiar characteristics of these meadow land ditches are such, that during a part of the irrigation period, the water diverted by such ditches overflows the banks, so that it would not be practicable to operate measuring flumes as are ordinarily operated under different conditions. There are a multiplicity of such meadow land ditches, most of which are comparatively small, and the cost of installing and maintaining standard measuring equipment on such ditches would constitute a great hardship upon the owners of such ditches, because of the relatively small acreage irrigated under almost any of these ditches, and we do not feel, therefore, that it was needful to require such ditches to maintain standard measuring equipment, as we do in other localities in Colorado where the conditions are entirely different.

It has been my opinion, and I have so interpreted the Decree as it affects meadow lands that the amount of water diverted was based upon the number of acres of land irri-
(757) gated and therefore it was unnecessary to have measuring devices in the mountain meadow land district.

I have also construed the decree to mean that the acreage to be irrigated in the Mountain Meadow lands section, was limited to 4,250 acres, and it has been my intention to comply with the terms of that decree and limit the irrigation of the meadow lands to 4,250 acres.

The first intimation that I had of any complaint on the [fol. 611] part of Wyoming was as I re-all, either the latter part of February or the forepart of March, 1928. From that time on and up to the time of the filing of the present suit by the State of Wyoming, in 1930, I had several conferences with the Wyoming officials with respect to the position Colorado took in regard to the complaint.

(758) Referring to my diary I find that we held a conference at Cheyenne on May 7, 1929, at which were present on the part of Colorado, Delph E. Carpenter, at that time Inter-State Streams Commissioner, and myself. Those representing the State of Wyoming, were Governor Emerson, Attorney General Wilson, Mr. Watson, his assistant, Mr. Whiting, State Engineer and there possibly may have been others.

The general subject discussed at that conference was the matter of interpretation placed upon the Decree of the United States Supreme Court by Wyoming and by Colorado, and such other matters as had been raised by Mr. Whiting prior to that meeting in his conversations and correspondence with me concerning the measuring of water out of the Big Laramie River by Colorado into the Poudre River.

The position of Colorado as I recall, was that the decree limited the amount of water which the Skyline could divert to 18,000 acre feet, and also that the tunnel was limited to 15,500 acre feet in any one year. There was some discussion at this conference also about the rights of the Columbine and Bob Creek Ditches to divert, and concerning the matter of (759) measuring the water diverted by the Colorado ditches. As to this latter matter, we advised Wyoming that we would welcome her State Engineer coming into Colorado to measure the water that was diverted

out of the Big Laramie River and its tributaries, by Colorado ditches; that we would co-operate with them to that [fol. 612] end. That they had free access at any and all times to such measuring equipment as we were then using, and that we would be glad to make any improvements to such equipment as Mr. Whiting, or the State of Wyoming might feel needful. Also that they would be welcome to look over any of our automatic register charts, or any other data pertaining to such trans-mountain diversions. We also offered to furnish to Wyoming officials a daily record of gage height readings of trans-mountain diversions. There was a subsequent conference held (760) on May 20, 1929, at which were present, representing the State of Colorado, Delph E. Carpenter, Interstate River Commissioner, Fred A. Harrison, Assistant Attorney General, and myself. Those present on behalf of the State of Wyoming were Attorney General Wilson and Mr. Whiting, State Engineer and Interstate Streams Commissioner. The general subject of discussion at this conference was a review of what had taken place in our previous conference, going over the various points which had been raised before by Wyoming with respect to interpretation of this decree.

I recall that Governor Emerson, of Wyoming, due to pressing engagements, came into the meeting in Mr. Whiting's office and had to excuse himself before the meeting was completed. There was some discussion with respect to the measuring devices installed in trans-mountain ditches. On behalf of Colorado, we again offered to co-operate with Wyoming in making any improvements or changes in our measuring devices as Mr. Whiting, State Engineer of Wyoming, felt needful and offered to exchange or furnish them copies of our records of the diversions out of the Laramie River and to extend every facility for acquainting Mr. Whiting with the amounts of such diversions.

[fol. 613] The sum total or result of that meeting, was the same as in the former meeting on May 7th, that no decision was (761) reached. I may add that on the May 20th, 1929, one of the matters very prominently discussed was Colorado's position with respect to her belief that the Supreme Court decree allocated to Colorado the 37,750 acre feet as a mass allocation and that it might be diverted and used by any of the diverting agencies diverting water

in or out of that Basin. This 37,750 acre feet being in addition to that relatively small quantity appropriated by the Wilson Supply Ditch prior to 1902. According to notes in my diary there was a further conference held at Greeley, September 26, 1930, and there were present at that conference, representing the State of Colorado, Attorney General Underwood, Deputy Attorney General Roach, Assistant Attorney General Harrison and myself. Those present for the State of Wyoming were Attorney General Wilson, the then Assistant Attorney General Greenwood and Mr. Whiting, State Engineer. Delph Carpenter who at that time was Interstate (762) Streams Commissioner for Colorado was also present at the meeting.

The general subject of discussion at that meeting consisted largely of a review of what had been discussed in the two former conferences in Cheyenne and Colorado's interpretation of the decree of the Supreme Court, and the expression on the part of the officials of Colorado of their desire to adjust this matter amicably between the states; to endeavor in every way possible that they felt right and just, to meet Wyoming's contentions and wishes, and to co-operate with them in seeing that the decree of the court was strictly adhered to.

[fol. 614] As I recall, it there was also some discussion concerning measuring devices, but that was not as prominent as was that given to other phases of the controversy between the States, such as mass allocation and as to what agencies should divert water.

Colorado's attitude with respect to mass allocations was the same at this last conference as it had been at our two previous conferences concerning which I have testified. There was no definite results from this conference.

(763) There was a subsequent conference held by Colorado-Wyoming officials in Cheyenne on August 20, 1932. Those present on the part of Colorado were Attorney General Ireland, Assistant Attorney General Plunkett, Mr. Lee an Attorney of Denver and myself. Those representing the State of Wyoming were according to my recollection Attorney General Greenwood and his deputies, I believe Mr. Watson and Mr. Jackson.

The general subject discussed at this conference was substantially the same as that covered in the previous meetings

with the Wyoming officials and the result of this conference was that the two states were unable to harmonize their views (764) with respect to the construction of the decree of the Supreme Court.

At the conference held by the officials of the States of Wyoming and Colorado at Greeley on September 26, 1930, I recall that someone representing Colorado, whose name I do not at this time remember, asked Attorney General Wilson if it was his interpretation of the court's decree that the amount of 37,750 acre feet was in the nature of a mass allocation to the State of Colorado and her agents, and he said "Yes". It was then asked if it was Wyoming's [fol. 615] understanding, or belief, that it made any difference under such interpretation if any of these several agencies in Colorado should divert in any one year more than the amount mentioned in the decree, particularly with respect to the designation of 18,000 acre feet to the Skyline Ditch, and my recollection is that Attorney General Wilson in reply to that question stated that he thought there would be no objection on the part of Wyoming to such an interpretation of the decree. In other words, if the Skyline ditch, for instance, should divert more than (765) 18,000 acre feet in any one year, there would be no objection on the part of Wyoming, so long as diversions by other agencies were reduced to the extent of holding down the total diversion, or total use in any one year to 37,750 acre feet, in addition to the relatively small amount appropriated from Deadman Creek prior to 1902. There was however a divergence of opinion with respect to these matters among the Wyoming officials as I recall.

Cross-examination.

By Mr. James A. Greenwood:

In what I have just stated with reference to my last question on direct examination I am not attempting to quote the words of General Wilson of Wyoming, but I am endeavoring to convey what is my recollection of the statements he made at that time.

Mr. Greenwood: That is all.

[fol. 616] (766) FRED A. HARRISON, witness in behalf of defendant.

Direct examination.

By Mr. Shrader P. Howell:

I reside at Aurora, Colorado, and have been a resident of the State since 1895. I am an attorney at law and have served as Assistant Attorney General of the State under former (767) Attorneys General Winbourn and Underwood and as Deputy Attorney General under General Ireland. My term of service extended to about May 1929, to March, 1932.

During my service as Assistant or Deputy Attorney General of Colorado, I had occasion to examine and interpret the Decree of the United States Supreme Court in the case of Wyoming vs. Colorado, and to confer with and advise Mr. Hinderlider, State Engineer, with respect to the construction of that Decree, particularly as it affected the latter official's duty. I do not recall that any former written opinion interpreting the Decree of the United States Supreme Court was ever rendered to Mr. Hinderlider.

(768) It was our opinion and Mr. Hinderlider so advised verbally that "the Decree in the Wyoming-Colorado case was an allocation of water between the two states outside of the portion of the Decree which enjoined the Laramie-Poudre Tunnel from diverting more than 15,500 acre-feet of water per annum by virtue of their appropriation. It was our opinion and Mr. Hinderlider was so advised that Colorado by that Decree was given 37,750 acre-feet of water per annum, and that relatively small amount that had been appropriated by the Wilson Supply ditch, prior to 1902, to be used as it saw fit, except for the tunnel portion of that Decree. The meadow appropriations which are mentioned in the Decree are 4,250 acre-feet, I believe. As [fol. 617] to those appropriations our opinion was that they meant consumptive use of that amount of water. In other words, that that amount of water diverted from the Laramie for use on the meadow lands would be enough, so that 4250 acre-feet could be used."

I mean that 4,250 acre-feet of water diverted from the Laramie for the use of the meadow lands could be actually consumed or burned up, and the amount of water flowing

across the Colorado-Wyoming line would be depleted to that extent.

(769) That during my service in the Attorney General's office of Colorado, I attended three conferences with the officials of Wyoming with respect to water controversy. The first on or about May 20, 1929, the second in the late summer or early fall of that same year and the third in the fall of 1930. At the first conference, which was held in Cheyenne, Wyoming, as I now recall the facts, there were present representing the State of Colorado, Mr. Hinderlider, the State Engineer, Mr. Delph E. Carpenter, Water Commissioner of Colorado, and myself. There were present at this conference representing the State of Wyoming, according to my recollection, former Attorney General Wilson, Deputy Attorney General Greenwood, Mr. Whiting, the State Engineer, and some others whose names I do not now recall.

(770) At this conference the matter of the construction of a Decree in the Wyoming-Colorado case was under discussion and there was also some mention made of Wyoming's desire to install measuring devices in addition to those of Colorado, and Wyoming asked permission to check our measuring devices then installed on trans-mountain diversion ditches. Colorado's attitude was that we would give Wyoming the utmost cooperation in checking our devices and securing information as to the amount of water [fol. 618] diverted and I know of my own knowledge as to the amount of water diverted that the caretakers in at least two cases were given instructions to allow Wyoming access to Colorado's measuring devices at any time.

There was nothing accomplished at this first meeting because we could not agree upon the construction of the Decree as to the amount of water to which Colorado was entitled.

(771) According to my recollection a further conference between Wyoming and Colorado officials was held at Greeley, Colorado, in the late summer or early fall of 1929, at which meeting I think practically the same personnel was present on the part of both Wyoming and Colorado. The general subject of the discussion was the same at this conference as at the previous meeting of the representatives of the two states and Colorado's attitude with respect to the matters under discussion was the same as at the former

conference. There were, however, no direct results obtained.

The third conference was held according to my recollection at Greeley, Colorado, in September 1930, and at that meeting representing the State of Colorado, were present, General Underwood, Delph Carpenter, Water Commissioner, Mr. Hinderlider, State Engineer, and myself. And representing the State of Wyoming, were Attorney General Wilson, Mr. Greenwood, Deputy Attorney General, Mr. Whiting, State Engineer, and perhaps one (772) or two others.

I recall that Attorney General Wilson of Wyoming stated at the beginning of the discussion as I remember it "that Wyoming was prepared to concede to Colorado the right to divert and use 37,750 acre-feet of water per annum, and in addition thereto, that relatively small amount appropriated by the Wilson Supply Ditch prior to 1902." That [fol. 619] was the first time Wyoming had offered any concession as I recall and we felt rather hopeful of getting together, but it developed during the course of the conference that there was and it is of opinion among the representatives of Wyoming that nothing definite was accomplished as a result of that conference.

(773) I recall that Mr. Greenwood, the then Attorney General of Wyoming, said to me in a conversation which occurred sometime during the course of this 1930 conference, that "they were not particularly excited about the Meadow land diversions, because a great portion of the water diverted immediately returns to the river, because of the nature of the land and the method of irrigating these meadow lands, and that no more than 10% of the water diverted was consumed for irrigation" and that about 90% returns to the river.

(Defendant's Exhibit "F" offered in evidence.)

(Defendant's Exhibits "G" and "H" marked for identification.)

(Defendant's Exhibits "G" and "H" offered in evidence.)

Mr. Howell: The defendant, the State of Colorado offers in evidence defendant's Exhibit "F", being properly certified copies of the findings and decree entered in the matter of the adjudication of priority of right to the use of water

for irrigation in Water District No. 48, State of Colorado in case numbered 1247, entered on the 30th day of October, 1896, by the District Court of the 8th Judicial District of the State of Colorado for Larimer County, and we ask that same be received in evidence.

Mr. Greenwood: Complainant at this time objects to the introduction of defendant's exhibits "E" and "F", on the ground that the same is wholly incompetent, irrelevant and immaterial, not relating to any of the issues involved in this case; not in any way binding upon the rights of the [fol. 620] complainant with reference to its use of the waters of the Laramie River, the matter having been determined by the United States Supreme Court in a decree of June 5, 1922, and as modified by Supplemental Decree of October 9, 1922.

(774) Mr. Howell: State of Colorado offers defendant's Exhibit "G" in evidence and asks that the same be received as evidence in this case, this exhibit being properly certified, the findings and decree in the matter of the adjudication of Priority of Right to the use of water for irrigation in Water District No. 48, State of Colorado, in case numbered 1885, entered on the 11th day of October, 1906, by the District Court of the 8th Judicial District, State of Colorado for Larimer County, Colorado.

Mr. Greenwood: To which offer complainant makes the same objection as interposed to defendant's Exhibit "F".

Mr. Howell: Defendant State of Colorado offers defendant's Exhibit "H" in evidence and asks that the same be received as evidence in this case, which includes the findings and decree properly certified in the matter of the adjudication of Priprity of Water Rights in Irrigation District No. 48, of the State of Colorado, for irrigation and other beneficial uses, in case numbered 2725, entered on the 20th day of February A. D. 1914, by the District Court of the Eighth Judicial District of the State of Colorado, Larimer County, Colorado.

Mr. Greenwood: As to this exhibit complainant makes the same objection to defendant's Exhibit "H" as interposed to defendant's Exhibit "F".

No cross-examination.

[fol. 621] Exhibit "F", is a certified copy of the Decree of the District Court of Larimer County, Colorado, ren-

dered in an adjudication proceedings in said Court, of and concerning the various ditches taking water from the Laramie River and its tributaries in Colorado in Water District No. 48, of Colorado.

This Decree was entered on October 30, 1896, and among others decreed to the Water Supply and Ditch Company an appropriation from the Laramie River for its Skyline Ditch or Laramie River Ditch as of the date of August 7, 1891.

In this Decree each ditch has its separate findings and order and full findings and decretal order for said ditch is hereafter found at pages 1272 to 1276, when the President of the Company was interrogated.

In this same adjudication there were some twenty-nine other ditches adjudicated, all of which were what is denominated in this case as Meadow Land Ditches for the Meadow lands along the Laramie River and its tributaries in Colorado, and the same are hereby listed by name and date of priority as follows:

[fol. 622] Name of Ditch	Date
Mansfield No. 2	June 1, 1880
Hills Ditch	July 1, 1880
Warren Ditch	Mar. 25, 1881
Hance Ditch	Mar. 31, 1881
Stuck Creek D	Apr. 1, 1881
Jim Creek Ditch	July 10, 1881
Bliler & Boswell	Apr. 1, 1882
Mansfield D.	Apr. 20, 1882
Yelton D.	July 1, 1882
Martin D. No. 1	Apr. 20, 1883
La Garde D.	June 10, 1883
Ward D. No. 1	June 15, 1883
Ward D. No. 2	July 1, 1883
Jimmy Creek D.	June 1, 1884, May 1, 1891
Smiths' Brown D.	June 10, 1884
Trollope Creek D.	June 15, 1884, May 29, 1896
Homestead D.	July 10, 1884
Martin D. No. 2	Apr. 30, 1887
Grace Creek D.	Apr. 1, 1888
Brown Ditch	May 31, 1890
Lamb Ditch	June 1, 1880
Laramie River D.	Aug. 7, 1891
Comet Ditch	Dec. 7, 1892
Forrester D.	May 15, 1893

Name of Ditch	Date
Pache D.	May 25, 1893
Link Ditch No. 1	June 1, 1894
Lone Tree D.	Oct. 24, 1894
French Woman D. (conditional)	May 28, 1896
Slough Creek D.	May 30, 1896
Link Ditch No. 2	June 15, 1896

[fol. 623] Exhibit "G", is a certified copy of the Decree of the District Court of Larimer County, Colorado, of further adjudication of water rights in Water District No. 48, in Laramie River and tributaries in Colorado, at page 774.

In this second Decree, the Wilson Supply Ditch named therein as the Sand Creek Ditch System procured a decree for its appropriations of water as of the date of June 15, 1899, and the particular findings and Decretal Order of and concerning this ditch system fully appears at 1450 and 1451, where it is set forth in full. This Decree was rendered on October 11, 1906, and in the same proceedings there were some twenty meadow ditches also adjudicated as follows:

Name of Ditch	Date
[fol. 624] LaGarde D. No. 1	June 16, 1896
Detrow D. No. 1	June 17, 1896
Sand Creek D.	June 18, 1896
Parker D.	Oct. 10, 1896
Ben Warren D.	July 15, 1897
	July 15, 1900
Sand Creek D. System	June 15, 1899
Spring Cr. D. No. 1	Apr. 15, 1900
Seepage D. No. 2	May 1, 1900
Grace Cr., D.	Apr. 28, 1900
Spring Cr. D. No. 2	May 2, 1900
Springer D.	Sept. 11, 1900
Brown D.	Sept. 10, 1900
Davy Ditch	Sept. 15, 1900
The Cabin D.	Sept. 16, 1900
Chas. E. Lanning D.	June 1, 1901
Forrester Cr. D.	June 30, 1901
Homestead D. No. 1	Oct. 22, 1901
Homestead D. No. 2	Oct. 23, 1901
Ferguson D.	Dec. 31, 1901

Name of Ditch	Date
Lamb Ditch	May 28, 1902
Forrester Cr. D. No. 2	May 30, 1902
Talmage D. No. 1	May 31, 1902
Long Park D. No. 2	June 1, 1902
Nun Creek D.	July 8, 1902
Lanning & Springer D.	July 9, 1902
Long Park D.	July 10, 1902

[fol. 625] DEFENDANT'S EXHIBIT H

In the District Court

STATE OF COLORADO,
County of Larimer, ss.

Findings

In the Matter of the Adjudication of Priorities of Water Rights in Irrigation District No. 48, of the State of Colorado, for Irrigation and other Beneficial Uses

The findings, among other things provide:

"The Laramie River System of the Greeley Poudre Irrigation District

"The Greeley-Poudre Irrigation District, a quasi-public or municipal corporation, duly organized under the laws of the State of Colorado, is the owner and claimant herein of a general system of ditches, reservoirs and tunnel now in process of construction in Water District No. 48, for the diversion, storage and conveyances of waters of the Laramie River and tributaries to the Cache la Poudre River, whence the same will be diverted into and carried, stored, and distributed and applied by means of a system of ditches and reservoirs in Larimer and Weld Counties, owned by the District, for the irrigation of 125,000 acres of land in Tps. 7 and 8 North, Range Sixty-seven West; Townships 7, 8 and 9 North, Range Sixty-six West; Townships 6, 7, 8 and 9 North, Range Sixty-four West; Townships 6, 7, 8 and 9 North, Range Sixty-three West, and Townships 7 and 9 North, Range Sixty-two West of the 6th P. M.; all

in Weld County, Colorado, which lands go to make up and do constitute the Greeley-Poudre Irrigation District. The system of works, in Water District No. 48, shall be hereinafter designated in this and special findings as the "Laramie River System" of claimant and consists of the following units, each of which is to a greater or less degree interdependent upon the other units operated therewith, [fol. 626] all of which, working either alone or in conjunction one with another, constitute a complete system of works, the operation of each and all of the several units being necessary for the diversion and storage of water by the entire system:

The Rawah Ditch;
The Rawah and Lower Supply Ditch;
The McIntyre Ditch;
The Deadman and Nunn Creek Ditch;
The Laramie River Tunnel;
The Link Lake Reservoirs, Nos. 1 to 14 inclusive; and
The Tunnel Reservoir.

"The system consists throughout of works requiring great financial outlay. It is located at an elevation of from 8500 feet to 11,500 feet above sea level, a portion thereof being at timber line and in the region of perpetual snows. All of the construction involves tunneling and excavation through mountains and along the steep mountain sides on either side of the Laramie Valley, requiring a greater period of time in the completion thereof than would be required to complete an enterprise of like proportions situate under and surrounded by ordinary conditions. All supplies, machinery and labor must be transported by teams for a distance of from seventy to one hundred miles, in large part over mountain roads, from either Laramie, Wyoming, or Fort Collins, Colorado, under conditions least favorable to economical transportation.

"Owing to the altitude, climatic conditions and geographical location of the system, the working season, during which men may be engaged in other than tunnel construction, and the season of transportations of freight, are limited to a short period of from three to four months out of each year. The remoteness of the works from railroads, towns, cities, and labor centers, makes the obtaining of

laborers difficult, and requires payment of high wages and maintenance of expensive accommodations. The construction throughout is of hazardous character, requiring the [fol. 627] use of dynamite, powder and other explosives and the service of a class of laborers hard to obtain and easily dissatisfied. The shortness of the working season requires a total disorganization of the entire laboring force at the close of each year's work and complete reorganization the next succeeding year. The foregoing and many other obstacles unknown to construction of irrigation works in plains or prairie regions or in regions of better climatic conditions and geographical location, require longer periods of time than would otherwise be necessary, reasonable diligence being a question of years as compared with months under ordinary conditions.

"The construction of the system of works of the claimant upon the Laramie River were commenced by the initiation of surveys on August 25th, 1902, and since said date the work of engineering and construction has continued with diligence, notwithstanding financial and other obstacles although since 1911 active work upon said system has been in large measure suspended owing to the effect of litigation pending in the United States Supreme Court between Wyoming and Colorado, and involving the right of claimant to divert the waters of the Laramie River by means of this system of works."

"Owing to the conditions under which the work upon said system was commenced and since prosecuted and the many obstacles to be overcome, as well as those unmentioned as those hereinbefore specified, it is found that more than ordinary diligence has been exercised by the claimant, and its several predecessors, in the prosecution of said system of works from August 25th, 1902, to the present time."

"Each of the several units, while interdependent in large measure upon the other units of the system, nevertheless involves diversions from different tributaries of the Laramie River and is segregated into specific names and findings for the purpose of this decree. Each unit is given [fol. 628] the same date of priority, and although different priority numbers are given, nevertheless each unit of said system shall have equal priority with each of the other units thereof."

Decree entered in the District Court of Larimer County in said proceedings on February 20, 1914, provides, among other things:

"This decree shall be taken, deemed and held as intended to determine and establish the several priorities of right by appropriation of water from the streams of said Water District No. 48, for irrigation, of the several ditches, canals and reservoirs in said District, concerning which testimony has been offered in this matter, each according to the construction, enlargement or extension thereof, with the amount of water held to have been appropriated thereby.

"All priorities first awarded in this Decree which are adjudged to have taken effect on the same date are of equal seniority as to each other, regardless of the different numbers that may have been given to this decree."

The decree awards priorities for the said enumerated works of the "Laramie-Poudre System" all of the same date, August 25, 1902 except the Tunnel Reservoir, which was awarded no decreed priority.

[fol. 629] The said decree of the Larimer County District Court of February 20, 1914, also awarded priorities of appropriation to ditches of names and dates as follows:

Name of Ditch	Date
John Goetz Ditch No. 1	June 1, 1879
Ollie Ditch	June 1, 1886
Upper Hills Ditch	May 1, 1887
Stuart Ditch	April 15, 1896
La Garde Ditch Enlargement	June 1, 1896
Jimmy Creek Ditch Enlargement	June 2, 1896
Link Ditch No. 2 Enlargement	June 15, 1896
Brinker Creek Ditch	July 10, 1901
Mansfield Ditch Enlargement	April 1, 1902
Mansfield Ditch No. 2 Enlargement	April 15, 1902
Pine Creek Ditch	Aug. 20, 1902
Nellie Ditch	Sep. 10, 1903
Timothy Ditch	June 5, 1904
Mansfield Ditch No. 3	Sept. 1, 1904
Detro Ditch No. 2	June 16, 1906
Grace Creek Ditch No. 2 Enlargement	April 1, 1907

Name of Ditch	Date
McIntyre Ditch	July 25, 1908
Thompson Ditch	May 26, 1909
John Goetz Ditch No. 2	June 9, 1909
Shell Creek Ditch	June 10, 1909
Dry Creek Ditch	June 11, 1909
Martin Ditch No. 2 Enlargement and Extension	May 25, 1910
Pine Creek Ditch Extension	July 8, 1911
Stubb Creek Ditch	July 28, 1911
Stewart Ditch No. 2	May 24, 1913

[fol. 630] And the following reservoirs:

Reservoirs	Date
Johnson Reservoir	June 1, 1897
Laramie River Reservoir	April 6, 1908
Wears Ditch and Reservoir	Oct. 15, 1908

[fol. 631] WILLIAM J. MCANELLY, witness in behalf of defendant:

Direct examination.

By Mr. Shrader P. Howell:

(775) My name is William J. McAnelly; I reside in Fort Collins, Colorado, and have lived in that vicinity for 49 years. The section in which I live is irrigated and I have been familiar with irrigation systems practically all of my life. I am Water Commissioner of Water District No. 3, and have served in that (776) capacity since April, 1921. I was educated in the public schools of Fort Collins, attended the State Agricultural College at Fort Collins for three years, and I am a registered civil engineer of the State of Colorado, president of the Engineers' Club of Fort Collins, a member of the executive committee of the Colorado Engineering Council; in 1903 I was on the preliminary survey and assisted in preparation of maps, plans and specifications of the Julesburg Irrigation District project in Morgan and Sedgwick Counties, Colorado, and was engineer in charge of construction of that project, consisting of inlet and outlet ditches, the Jumbo Reservoir and all structures pertinent to it. In 1904 and 1905 I was in

charge of the construction of the sewer system in the Town of Windsor, Colorado; 1906, engineer in preliminary survey for the Municipal Water Works pipe lines for the City of Greeley, and engineer in charge of sewer construction for the City of Greeley, Colorado; in 1907, in charge of the construction of the Eaton Valley Project in the Big Sandy River in western Wyoming; 1908 and 1909, engineer on preliminary work for the North Sterling Project in Logan County, Colorado; and in charge of construction of inlet and outlet ditches of Point of Rocks Reservoir; 1910, preliminary survey of the South Side Project in Logan and Sedgwick Counties; construction engineer in charge of Mount Pisgah Reservoir in Teller County, Colorado, for the Garden City Irrigation District of Canon City, Colorado; 1911, construction engineer in charge of [fol. 632] (777) the irrigation project in the Las Vegas Grant in Las Vegas, New Mexico; 1912 and 1913, in charge of the construction of the Greeley-Poudre Irrigation District Project in Larimer and Weld Counties, Colorado. In 1914 I became superintendent of The Water Supply and Storage Company, Fort Collins, Colorado, which included properties in Grand, Jackson, Larimer and Weld Counties, Colorado, having charge of all water supplies and distribution, and doing the general engineering work for the company. From April, 1921, to and including the present time, I have acted as Water Commissioner of District No. 3 in Division No. 1, in the State of Colorado, being in the South Platte drainage and more particularly described as the Cache la Poudre drainage in Larimer and Weld Counties. During part of 1927, all of 1928, 1929, 1930 and 1931 and part of 1932, I served the City of Fort Collins, Colorado, as Commissioner of Works, having charge of all street works, municipal water works, municipal sewer system, municipal street car system, city parks, and all public utilities.

(778) As Water Commissioner of District No. 3, I handle all trans-mountain diversions into this district, make all exchange of water that is to be made, keep a correct account of the same and see that accounts are properly balanced between the various interests before the close of each irrigation season. I have charge of the administration of the Court decrees of Water District No. 3, which consists of all of the drainage of the Cache la Poudre in Colorado.

Weekly reports from my office are made to the State Engineer, giving a flow report of all water in the river and also my office makes a Monday and Thursday report each week during the irrigation season. The storage report includes the amount of water going into storage during the week, the number of days when water was stored and the reservoir into which it was delivered. The weekly reports show the Saturday flow of the river, the average for the seven [fol. 633] days of the week, what part went for direct irrigation and what part went into storage and how much passed out of the district (779) through the mouth of the river. This report is made each week during the year. I also report the trans-mountain diversions each week and the Monday and Thursday reports show the river flow and what was done with the water, for each of those days during the irrigation season. I also make an annual report as provided by law. All automatic measuring charts go through my hands, and after I have figured them they are sent to the State Engineer's office and become a part of his records.

There is a method of exchange which prevails in the Poudre Valley which operates along the following general line: Our river, the average flood is 10 days to 2 weeks, and we are appropriated, and you might say over-appropriated, so that the later appropriators only receive from about that time from the direct irrigation decree. They saw they would have to supplement that flow to raise the crops which they could raise in the latter part of the season, so that the ditches which had the later decrees began to build reservoirs, and of necessity they had to be built (780) as cheaply as possible—they didn't have money to go into extensive work—and they built reservoirs which would utilize the present ditches which they had built. This left the water below their system which was not available to them, so there had to be some scheme where this water could be worked back up the river and made available. The first large ditch on the river has the senior decree, and is the lowest point on the river, or farthest down to divert. The next large ditch which has the next appropriation to them is the first large ditch up the river from the senior appropriator. It so works up the river until we get to the North Poudre System, which is the highest large ditch to divert from the Poudre or its tribu-

taries, and has the junior decree. This being the case, we [fol. 634] gave them the opportunity to take the senior appropriator's water from the river and repay it to them from some one of the junior appropriator's reservoirs directly into their ditch. To illustrate: North Poudre, being the junior appropriator on the river, and being the first one to drop off of the river on direct flow, need the water to continue its operations, and having water in its reservoir system below its ditch, but which is not available to them, will call on the water officials for exchange. The Windsor Reservoir, which is the largest reservoir in the valley, and lying directly above the Greeley No. 2 Canal, which has the direct flow water in the river, can be paid directly from this reservoir into their ditch below the headgate of the same. The water is therefore taken out of the river on North Poudre's call and delivered to the Greeley No. 2 Ditch directly from Windsor Reservoir. This necessitates the keeping of books on all of this exchange as it will pass through from four to six different ditch (781) corporations before the accounts are finally settled. The Windsor Reservoir takes credit in the North Poudre System for the water so delivered. This credit, in turn, is turned to The Water Supply and Storage Company for water that they have below their system, and is not available to them. This automatically moves the Water Supply and Storage water, which is below their system, and not available to them, to a position above their system, and is available. This water below The Water Supply and Storage Company, in their reservoirs, which is not available to them, is in turn given as a credit to the Windsor Reservoir, which makes the Windsor Reservoir water available to the Larimer and Weld County canals, which was below the Larimer and Weld Canal and not available to them before. There are various different transactions that are carried on that do not enter into all the ditch companies, but can be handled by the one company alone, the Windsor Reservoir Company No. 8 reservoir, which is filled through the [fol. 635] Poudre Valley Canal, and by exchanging Windsor water direct to No. 8 makes it available for their own stockholders under the Larimer-Weld Canal.

About 15 or 16 reservoirs are used in the exchange method which I have just described. This system of exchange (782) makes for closer cooperation among the ditch companies and results in making water available that

otherwise would be lost to the district. The system has been found to operate to a very great advantage to the appropriators and it adds to the economic use of the water. Among other advantages of the system is that it requires the accurate measurement of waters diverted and requires close supervision at all times. The system is in effect a clearing house for all of the water in the valley. About 267,000 acres are irrigated through 24 major systems, and approximately 70 reservoirs are used to supplement the flow of the river. These (783) reservoirs have a total capacity of 140,000 acre feet. Approximately 235,000 — of water is diverted during the year in District No. 3. Not all of that water originates in the Cache la Poudre watershed, but about 15% of the total flow comes from the Colorado River, the North Platte River and the Laramie River. The ditches which bring the waters from other watersheds and into the Cache la Poudre are the Skyline Ditch, the Larmie-Poudre Tunnel, Bob Creek Ditch, Columbine Ditch, Sand Creek Ditch or Wilson Supply Ditch, the Grand River Ditch, Michigan Ditch and Cameron Pass Ditch. All of these ditches have devices for measuring water, (784) consisting of rating flumes, staff gauge and automatic registers, which run either 7 or 8 days. These measuring devices are inspected at least once every 24 hours, and I also inspect them whenever the occasion arises. Those ditches which bring the portion of the trans-mountain water delivered into the Poudre from the Laramie River are the Skyline, Laramie-Poudre Tunnel, Bob [fol. 636] Creek, Columbine, Sand Creek or Wilson Supply ditches. If water which comes into the Poudre basin from outside sources were not accurately measured, it would result in great confusion (785) and injury to some user in Water District No. 3. If there was any inaccuracy in the measurement of these trans-mountain waters it would be called to my attention immediately on account of the fact that all of the water users in the District very jealously guard their rights and see to it that they get as nearly their (786) full appropriations as is possible. The trans-mountain water is also used in connection with the exchange system which I have explained in this way, during the latter part of July of each year the river gets so low that we cannot run exchange—there is not enough

water available in the Poudre River for the purpose. We, therefore, run what we call a "borrow" or credit system, taking the water from the trans-mountain diversions and keeping sufficient water above the owners of that water so it may be repaid to those owners at a later date when it is needed. If incorrect reports were made on the trans-mountain water entering the Poudre River which showed more water reporting than actually entered the valley, then the owner of the trans-mountain diversion would be getting more water than he would be entitled to receive. This would result in some other user losing some of his water and there would be an immediate complaint. If, on the other hand, less water was reported than actually diverted through these trans-mountain ditches, there would be an immediate complaint from the (787) owner of the trans-mountain diversions. During all of my years as Water Commissioner, there have been inspections by users very frequently to see that their rights are protected, and I think those inspections are made by engineers at least each year.

I know that automatic recording devices have been in-[fol. 637] stalled at all of the diversions from the Laramie River into the Cache la Poudre, and I have personal knowledge that the one at the Skyline Ditch has been there since 1914 when I became superintendent of The Water Supply and Storage Company, and that the Sand Creek System recorder was there when I went on (788) the river in 1921. The first statute requiring installation of automatic registering devices on interstate streams was enacted by the Legislature of Colorado in 1921, and I know that at that time the measuring devices of which I have spoken were installed. They were installed prior to the decision of the Supreme Court of the United States in the original Colorado-Wyoming suit. It is my opinion that these installations were made by the owners in order to satisfy the other users in the Poudre Valley that the water claimed was actually diverted, and for the further reason that it was necessary in order that the owners might claim and use the amount so diverted without loss to themselves. I have never received any direct complaint that the measuring devices on the trans-mountain diversions were either inaccurate or inadequate, but there is always a feeling or attitude that the trans-mountain diversions are given a

little larger credit than they are entitled to have. Whenever I have received indirect information of this feeling or attitude, I have made an immediate inspection of the works, and if there was anything wrong, I have had it corrected immediately, and I have always cautioned the man in charge of the works to see to it that the ditch and measuring devices were kept in good condition and to be careful to read his charts accurately.

(789) A charge of 5% of the amount of water diverted by means of the trans-mountain ditches is made in favor of the river to compensate for loss and carriage of the water down the stream to the headgates of the users. The [fol. 638] method of administering the (790) Skyline Ditch is that the chart on the register at the ditch is checked for each 24 hours from 4 P. M. to 4 P. M. The discharge is then averaged in depth for the 24 hour period, and the average depth is calculated into discharge per cubic feet per second for the 24 hours. It is then turned in at 7 P. M. and taken off at 6 A. M. the next day, and the average 24 hour run, plus 5%, is charged off the river. The report of the day's run comes to me at 7 o'clock each evening. The reason the water is not credited to the owner until 6 o'clock the following morning is because of the lapse of time between when the water is turned into the river and the time it reaches the headgate of the distributing ditch. All of our trans-mountain diversions, reservoir runs and exchange water are worked from a certain period of time. (791) The water is turned into the river at a certain time, off at a certain other time, and shut out at another time. Our reason for this is that there are flush times and times when there is too little water, consequently we run the river as nearly on a- even line as is possible so that interference will not be had with older appropriators. We have a telephone connection with all of the trans-mountain diversion camps, excepting Sand Creek, thereby enabling us to receive reports from the gauge reader each day, except from the Sand Creek System, the operator of which system has to go to Laramie City to report, which he does three times each week. The telephone line to the Skyline ditch is owned by The Water Supply and Storage Company from the top of Pingree Hill to Chambers Lake, and all extensions from that (792) point to their several trans-mountain diversions. The

Water Supply and Storage Company pays all of the expense in connection with communications which I make with the ditch camp. The United States Government Forest Service also uses that line for its telephone communication into that area, as does the North Poudre Irri- [fol. 639] gation Company and the Laramie-Poudre Irrigation Company. The charts from the automatic gauges at the Skyline Ditch are taken off at 4 P. M. on each Saturday and are so arranged that they record a full period of 7 days. These charts are sent me and I check them against the gauge readers daily report for the preceding week, and when I finish such check I forward the charts to the State Engineer. If the gauge reader has made a mistake in his daily report, I note the error on the chart and make a correction in my daily report and in the amount of water delivered. (793) In addition to the charts, I keep my own daily record as the reports are sent me from the gauge reader. My check of the daily reports with the charts from the automatic register may be either plus or minus, but which ever it is I make the correction in the water in the Larimer County Ditch within the next 24 hours.

With respect to the Laramie-Poudre Tunnel, my instructions are that the daily reports are made from 4 P. M. to 4 P. M. and reported to me at 6 o'clock in the evening. The change is made at the Poudre Valley Ditch at 7 o'clock that night. It has a very much shorter distance to travel down the stream than the other trans-mountain waters. The charts are taken from the register at 4 o'clock on Saturday of each week, but I receive the daily reports (794) from the gauge reader at 6 o'clock each evening. I receive the charts from the Tunnel each 7 days just as I do with respect to the Skyline Ditch, and they are checked with the daily reports in the same manner and any errors are corrected in my report, but I do not touch or disturb the record. With relation to the Wilson (795) Supply Ditch, the situation is a little different, in this respect, the waters from this trans-mountain diversion are usually impounded in Worster Reservoir, and therefore the flow does not affect the river. I get reports from the gauge reader at the Wilson Supply Ditch three times each week on account [fol. 640] of the fact that he has to (796) go to Laramie City to make his report. This he does three times each week and reports to me at 12 o'clock noon. In making this

report by telephone he gives me the average 24 hour run for each day since his last report, that is, twice a week it will be for a two day run and once a week it will be a three day run. Sand Creek System is charged with a 24 hour period from the time we open the ditch, and that may be at any hour of the morning, and the charts register from that hour at which the water is turned on. I think I have been at the measuring device each year that the water has been turned into the ditch, and I have set the register chart each time since I have been on the river. The (797) mountain diversions have their large capacity at the lower or discharge end of the ditch, which results in the measuring devices in all of those being at the point of discharge rather than at the point of diversion from the stream and in that way all of the water which is diverted into the district is charged to the proper parties in the district where it is used. The law requires that the Water Commissioner of each district must keep an accurate account of all (798) water actually coming into his district. I am also familiar with the Bob Creek and Columbine Ditches and have been at those ditches a number of times. Each of these ditches have automatic registering devices and instructions to the gauge readers on these are the same as the instructions to all other gauge readers in the trans-mountain diversions into this valley. The reports from these two ditches come to me each 24 hours by telephone, reaching me at 7 o'clock in the evening and covering the hours from 4 P. M. to 4 P. M. The register charts are sent me once each week and they are checked and corrections made in the same manner as applies to *to* the Sand Creek System and the Skyline Ditch and the Laramie Poudre Tunnel.

[fol. 641] (799) The automatic registering devices about which I have been speaking consist of a clock with a dial on which the chart revolves. There is a float attached which rises and drops with the water in the flume and in that way the depth of water in the ditch is recorded. The device is placed in a little house at one side or the other of the rating flume and is connected with a well which is a small box or a round pipe in which the water raises to (800) the same elevation as the guage rod. The well is usually set in the quietest section of the rating flume. There are two types of registers used, called the Bristol and the Stevens. The chart of the Bristol is a round sheet just

like the dial of a clock. The Bristol registers and charts show the hours one way and tenths of a foot the other. The lines radiating from the center of this chart are placed one hour apart, and each day of the week, embracing 24 hours, is named at the outer edge. The circles which are shown on the chart parallel to the center, commencing at the outer edge, represent one-tenth in depth on the gauge staff. The record is made by a pen which uses a special ink and records the depths of the water in the well and the revolving of the sheet records the time. (801) The gauge staff used in connection with the measurements of water is a permanent mark in the rating flume which shows the depth of water passing through that flume. These gauge staffs are metal gauges, enameled, and depths are registered the same as on a rule. These staffs are ordinarily placed at close proximity to the recording gauge and are the fixed points from which depths are taken and the readings are made. The depth on the gauge staffs is (802) the points that the register is set to for depth. This chart record is checked each 24 hours and if it does not correspond with the depth on the gauge staff, a correction is made and the pen is (803) reset. The instructions to the guage readers at each of the ditches on trans-moun- [fol. 642] tain diversions are that they should check the pen rating of the gauge staff, if it is not right, and to correct it immediately.

There is no division engineer in division No. 1, that office having been abolished in 1929, and the duties of the division engineer have been taken over by the State Engineer's office. My weekly reports were formerly made to the division (804) engineer of division No. 1, and since 1929 they have been made directly to the State Engineer. All of the data in my reports so far as District No. 3 are concerned are made up from my own knowledge, but so far as the trans-mountain diversions into District No. 3 are concerned I get that information from the register sheets which are sent me each week. These register sheets correctly and accurately show all of the trans-mountain diversions into District (805) No. 3, and as they are shown on the registering devices.

Since 1922 I have had authority from the State Engineer to measure and rate ditches and streams in District No. 3 and under that authority I have made a number of

ratings throughout this district. I make such ratings whenever there is dissatisfaction on the part of the one who is diverting from the river, or whenever there is a question in my own mind that there has been a change of conditions. Whenever any occasion comes which causes me to believe a rating should be made, I check the ratings and if the condition which has caused any change is of a temporary nature, I make a temporary rating, and when the condition is rectified the permanent (806) rating is again made. If, for instance, a hard storm of a few minutes duration breaks, it may be that there is debris below the weir of one of the canals, and I immediately make a temporary rating to take care of that particular situation for the time being. As soon as the ditch is put back into condition, I check it and a new rating is made. Such ratings are usually made with a current meter at 3 or 4 depths on the weir [fol. 643] and a table is then made showing the discharge at a different depth. It is my experience that an erroneous rating table could not be used for any of the canals in District No. 3 for any considerable length of time on account of the various appropriators watching the distribution of water so closely, and a complaint would be made by some party (807) affected almost at once. The water supply of the Poudre Valley added to the trans-mountain diversions coming into the river does not furnish an adequate supply for the irrigation needs of this valley. I do not know the percentage, but there has been a shortage of water almost every year since 1882. There have been times when we have had a surplus of water since I have been Water Commissioner. I think 1923, 1926 and 1929 were years when we had such surplus. Whenever such surplus occurs there is virtually no administraction of water required because all ditches and reservoirs (808) are getting all they can handle. Whenever that condition applies it is my practice to immediately call the superintendents of the various ditches receiving trans-mountain diversion and it is cut out of the trans-mountain ditches and allowed to flow in its natural course down the stream from which it is ordinarily taken. This applies equally to the Laramie River or the Grand River or Michigan (809) Creek, and on such event no record is made of any water passing through the trans-mountain diversion until the automatic register charts reach me at some later date.

These charts would show the exact (810) condition, and in that event the automatic register charts would act as a check upon my weekly report and would disclose any discrepancy between my report and the chart.

[fol. 644] CLARENCE L. IRELAND, witness in behalf of defendant:

Direct examination.

By Mr. Shrader P. Howell:

I am an attorney at law, a resident in and have my office in Denver, Colorado. I have served as Attorney General of the State of Colorado from January 12, 1931, to January 11, 1933. While I was Attorney General of the State of Colorado I had occasion in my official capacity to become familiar with the decisions of the Supreme Court of the United States handed (811) down about June, 1922, and also with the modified decree handed down about October, 1922, concerning the suit between the State of Wyoming and the State of Colorado, with respect to the water rights of the two states.

When I came into office I found that former Attorneys General of Colorado had taken the position that these water cases were suits between states and not between individuals, (812) and that the question of water rights on these interstate streams were issues between the sovereign states and not between the citizens of the states.

From my investigation and study of the opinions of the United States Supreme Court as contained in 259 U. S. and 260 U. S., I was and am convinced that the court clearly takes the (813) position and announces the rule that I have just stated above, viz: that these interstate water controversies are not between individuals of the respective states, but between the states themselves.

From my investigation and study of the opinions of the United States Supreme Court, it appears to me that one can come to only one conclusion and that is that the court intended (814) to make a mass allocation of right to water under the conditions and circumstances of 37,750 acre-feet, which is the Skyline, and the Poudre Tunnel plus

the 4,250 acre-feet of meadow, plus the unnamed amount [fol. 645] of water that went to the so-called Eaton interests through the Divide Ditch from Sand Creek and Deadman Creek. The court clearly indicates that it is intended that every year they will take their full share.

With respect to the meadow rights, the opinion does not state as to whether or not this "4,250 acre-feet is a consumptive use of 4,250 acre-feet or a headgate diversion, yet the reading of the entire opinion and particularly with the evidence in the case makes it clear that only one thing could be meant and that was consumptive use."

(815) Upon consideration of the testimony offered upon which the decisions above referred to were based, there appears to be no question "knowing the facts and circumstances that 4,250 acre-feet referred to is a consumptive use and not a headgate diversion and that being my interpretation of this decision I so advised Mr. Hinderlider, as State Engineer of Colorado, during my term as Attorney General, and it is my understanding that their Attorneys General, prior to my time, likewise advised Mr. Hinderlider, as State Engineer of Colorado."

It was of course the desire, intent and purpose of the State of Colorado and its officers to abide by the terms of the decree of the United States Supreme Court, as they understood it.

(816) It was my understanding of the decree, that so long as the interstate stream was not depleted beyond the full amount allowed or allotted under the opinion of Colorado, that the use of the water within the State of Colorado was a matter to be determined by Colorado's own citizens and did not enter into the controversy between the State of Colorado and Wyoming.

Since the interstate suit had been filed prior to my [fol. 646] coming into office as Attorney General, there was no occasion for formal discussing with the officials of Wyoming the facts upon which the controversy between the two states was based, and therefore, no formal conferences were held during my term of office.

(817) However, during my term as Attorney General the differences that existed between the two states growing out of the water controversy were mentioned informally in conversation with both citizens and officials of the State of Wyoming.

The attitude of officials of Colorado was that we were always willing to iron out the differences and do everything in our power to get together with Wyoming. We were not willing, however, to concede everything that Wyoming contended for. The Wyoming officials interpreted the decree one way, particularly with respect to the use of water, and Colorado took the opposite view and it seemed that there was little hope that the two states could be induced to place the same construction upon all the provisions of the decree.

No cross-examination.

RODERICK L. DOWNING, witness in behalf of the defendant:

Direct examination.

By Mr. Shrader P. Howell:

I was born in Lamar, Colorado in 1892, and resided within the state until 1914, thereafter I returned to Colorado in September, 1923, and have since resided here with the (818) exception of the period of time from December, 1925, to October, 1926, and am now residing at Boulder, Colorado. My profession is that of a Civil Engineer, and I am employed as Associate Professor of Engineering by the University of Colorado at Boulder.

[fol. 647] After receiving my credit in High School education at Lamar, Colorado, I attended the State University at Boulder and graduated therefrom in June, 1914, with degree of Bachelor of Science in Civil Engineering, receiving my degree as Civil Engineer from the University of Colorado in June, 1929.

(819) I am a member of several professional societies, among which is the American Society of Civil Engineers, the Colorado Society of Engineers, American Wood Builders Association and the Civil Engineers Fraternity. I have been engaged in the practice of my profession continuously since my graduation.

My professional experience has included the following:

I was engaged as a transit man in charge of an underground survey for the Grand Junction M. and F. Company at Camoe, Colorado, during the summer of 1913, and in

July, 1914, I was employed as instrument man for the Atcheson & Topeka Santa Fe Railroad Company with headquarters at Arkansas City, Kansas. Thereafter (820) February, 1916, I was transferred to the Chief Engineer's office at Topeka, Kansas, as draftsman on valuation map work, which position I resigned the following June to accept position as draftsman in the Chief Engineer's office of the Oregon Shortline at Salt Lake City, Utah.

In August, 1917, I was employed as field draftsman with the United States Bureau of Public Roads on highway location surveys and later was promoted to position of Highway Engineer in charge of field work on highway location. In September, 1923, I resigned and had a private practice at Rocky Ford, Colorado. During this period I made preliminary investigations and reports on three drainage projects, including that of the Grand Valley Drainage Project, the Valleyview Project and survey for water supply and sewage disposal for Otero Consolidated School, together (821) with the design and construction of three miles of [fol. 648] sanitary sewers for the city of La Junta and supervision and repairs on the water for the city of La Junta.

In December, 1925, I served as Field Engineer with the American Beet Sugar Company at East Grand Forks, Minnesota, in the construction of a $1,500,000.00 beet sugar factory, which work included supervision of the erection of twelve buildings of structural steel with brick walls and concrete work incident to the building of beet sheds, flumes and overhead railroad tracks. Also laid out the water intake from the Red Lake River and the pump house and pipe line to the factory as well as all drains and sewers around the factory.

In October, 1926, I accepted a position as Instructor in Civil Engineering at the University of Colorado, and one year later was promoted to the position of Assistant Professor in Civil Engineering and three years later promoted to Associate Professor of Civil Engineering, which position I now hold.

In connection with my teaching position at the University of Colorado the work consists of teaching Surveying, Water Supply, Highway Administration, Water Utilization, Hydrology, City Planning, Sewerage, Roads and Pave-

ments, Hydraulics, Municipal and Sanitary Design, Irrigation and Drainage and Mechanics.

During the summer of 1927 I was employed as Assistant Engineer with the Denver and Rio Grande Western Railroad Company as Resident Engineer on main line track reconstruction near Salida, Colorado, and during the following summer, I was engaged in a similar capacity with the Denver and Salt Lake Railroad Company in charge of a condition survey of the Moffat Tunnel.

(822) Thereafter, in the summer of 1929, I was engaged by the Gering and Ft. Laramie Irrigation District of Ger- [fol. 649] ing, Nebraska, to make an investigation and report relative to certain litigation involving drainage matters and in the summer of 1931, I made a plane table survey of the irrigated lands on the Laramie River in Colorado for the State Engineer of Colorado, and in the summer of 1932, I made a report to the City of Englewood, Colorado, on the adequacy of the plans of a proposed water supply.

By a plane table survey all information gathered by the survey is plotted on the plane table sheets to a suitable scale and a complete map is made as the survey progresses. The instruments necessary for this work consist of a drawing board supported on a tripod, the connection to the tripod being so arranged as to permit the board to be leveled and oriented or turned in the direction chosen for that particular sheet. An instrument called the alidade rests upon the plane table sheet and may be moved at the will of the operator. The alidade consists of a telescope mounted upon a horizontal axis and fastened to a rectangular base plate by means of a vertical standard.

(823) In the operation of the survey, a point on the plane table sheet corresponding to a point on the ground over which the plane table is set, is used as the instrument point. The edge of the base plate is rotated about this point until the line of sight of the telescope is directed toward the object to be mapped. In order to determine the distance of the object from the instrument, a rod which is marked in feet and fractions of a foot is held in a vertical position beside the object. In the telescope of the instrument are two horizontal hair lines placed at such a distance apart vertically that when the graduated rod is one hundred feet from the center of the instrument, the space

between where the two hair lines intersect the rod is ex-
[fol. 650] actly one foot when the telescope is horizontal. There is also a graduated scale and a marker to determine if the telescope is horizontal and if not horizontal, the deviation from the horizontal. By this latter device, differences of elevation may be determined.

I am familiar with the method of surveying used by the United States Geological Survey, in making surveys for preparations of its maps and the method employed by the survey is that which I made use of making the survey of the irrigated lands in the Laramie River District, except that we had no triangulation base for this particular survey.

(824) Aside from the differences just pointed out, the method employed in making the survey of the lands in the Laramie River Basin is essentially the same as that used by the Geological Survey.

The instruments which I used in making this plane table survey were of the latest design and by the use of which accurate maps can be produced.

(825) I consider the map, which I made, to accurately detail the conditions existing on the irrigated lands on the Laramie River in Colorado.

I also used in making this survey an internally focusing telescope with an inverted eyepiece which was designed to make it possible to read the graduated rod at greater distances from the instrument and also to make a less number of moves in order to map a designated area.

I was asked by the State Engineer on the last of June, 1931, to make a reconnaissance investigation of the irrigated lands in Colorado to determine the best method of making the survey and an estimate of the cost of the same.

I made the investigation and submitted the report to the
[fol. 651] State Engineer on July 3, 1931, in which report
I (826) recommended a plane table survey, for the reason that in the main, the irrigated areas were very irregular and unless the map was made in the field as the survey progressed so that the map could be compared in the field with the area which it represented, it would be very difficult to obtain complete notes without a return to the plat and a partial re-survey. I also recommended that the map be drawn to a scale of 1000 feet to 1 inch, as this scale would be most convenient in mapping an area so extensive.

I received final instructions from the office of the State Engineer of Colorado, covering the details of the work of making the survey on August 4, 1931, and the work was started on the morning of August 7, 1931, being continued every day except Sundays, when the work was finally completed.

I was instructed by the State Engineer of Colorado to carefully map the limits of all productive lands on the Laramie River or its tributaries in the State of Colorado, to locate the intake, and end and intermediate positions of all ditches, to locate all land lines and improvements, the extent of all irrigated lands or lands that had been irrigated and the extent (827) of all willows and timber within the irrigable area.

In making the survey I carried out those instructions and was present at all times when the survey was in progress and actually made the maps shown upon the plane table sheets. I had two rodmen in the party, one W. H. Thoman and A. L. Gustafson. Mr. Thoman is an Assistant Professor of Civil Engineering at the University of Colorado and is a graduate of the University of Illinois. He had had previous work for a period of two years, being in charge of plane table surveys for the United Fruit Company in South America, and the other rodman, Mr. Gustafson was [fol. 652] one of the highest men in our then sophomore Civil Engineering class at the University of Colorado. I considered him by reason of his experience as being possessed of more mature judgment than the average University man at the end of his second year.

In order to guard against possible errors in making a survey, I insisted that every instrument point be so placed that no weeds, brush, grass or trees would in any way interfere with the clear view of the graduated rod and if the points should be in a commanding position with respect to the lands to be mapped.

I also require that all instrument points be marked with a stake in a mount of stone and a streamer of red and white (828) cloth attached to the stake. When an instrument is moved from one point to another, I required that a rodman go back to the point from which the instrument was moved and a check reading was taken of the distance. We also took the further precaution of selecting a prominent object in the area covered by each sheet and sights were taken to this object at intervals to check against the instrument

moving out of line. I also had every instrument point covered and I had each rodman cover part of each area in such a manner that after the area was mapped and I was ready to move to the next instrument point the rodman would return to the instrument and each man would inspect his portion of the field and be able to advise me if any error existed before the instrument was moved. Thus they were also able to supply additional information relative to the lands that could only be given from a personal inspection and in all cases of doubt, I halted the survey until I was personally assured that no mistake was being made.

(829) During the early part of the survey it was necessary on a number of occasions to send the rodman back to his area for additional information, but in no case had we left the area with the instrument due to the fact that a [fol. 653] complete check was demanded before the instrument was moved in every case.

The extent of the survey was 25 miles along the line of the Laramie River, seven miles along McIntyre Creek, one mile on Nunn Creek, 4 miles on Jimmie Creek, 2½ miles on La Garde Creek, 1½ miles between LaGarde and British Creek, 2 miles on Grace and Slough Creek. The greatest width of the area was about three-quarters of a mile and the least width was not more than two hundred feet. It required nine plane table sheets to cover the area numbered from one to nine and with the dates and scale marked on each sheet together with the title of "Irrigated Land Survey Laramie River."

(Defendant's Exhibit "I" marked for identification.)

Defendant's Exhibit "I" is a correct copy of the map shown upon the plane table sheets.

The tracing from which the print of the map was taken is made in the State Engineer's office. I have personally, however, carefully checked the tracing by placing it over each plane table sheet and noting if all the details were (830) shown. The plane table sheets are made directly in the field and the tracing was made from these plane table sheets and the map which is referred to as Exhibit "I" is a print made by photographing the tracing. The tracing was made by placing transparent cloth on the plane table sheet and the actual lines shown upon the plane table sheets are reproduced upon the tracing cloth.

The defendant's Exhibit "I" is an exact reproduction (831) which appears on each of the nine plane table sheets.

In photographing the tracing, however, this has been reduced to practically 2500 feet to one inch, while the plane [fol. 654] table sheet scale was drawn to 1000 feet to one inch, and the purpose of making this change in the scale was to produce a map that would not be so cumbersome to use, and would show the same information. I found four or five errors, and marked them, and called the attention of the draftsman so that they might be corrected and later I compared the tracing with the plane table sheets and found that the corrections that I had indicated to the draftsman had been made.

I measured the acreage defoted to different uses, and made tabulations showing each. The areas were measured with a planimeter, which is a device for summing up the total area of irregular tracts and recording the result on dials on the instrument. The instrument was carefully checked before the work was started both by myself and by Mr. Tipton, of the State Engineer's office of Colorado and when the work was completed the instrument was again carefully checked and the work was found to agree with the results used in computing the area.

(832) We checked the instrument by using what is known as a proving ring of known area. The areas being first computed by a man from the State Engineer's office, and I also calculated the areas and listed the totals under each ditch independently. I then compared my areas by the areas obtained by the man in the State Engineer's office in every case where more than an acre difference was found, and know the measurements were made and agreement secured between the two sets of calculations.

I classify the acreage in the Laramie River Valley of Colorado as follows:

The first classification consists of irrigated meadow land, and includes all productive meadows from which hay is cut. The second classification includes all irrigated pasture land within the irrigated area. The third classification designated "Irrigated Sage Brush" covers an area that [fol. 655] was in the process of being converted into meadows by being irrigated killed the sage brush. None of the areas in the last classification has yet produced hay

and the ground is more or less covered (833) with sage brush in various stages of decay.

I have computed the acreage for the different classifications of the areas in the Laramie River Valley in Colorado and find that for the first class, productive meadow of 3,905.8 acres, the second classification, pasture land, which is irrigated consists of 264.7 acres and the third classification, irrigated sage brush, 64 acres.

By meadow land I mean to include land under irrigation ditches, which is irrigated and from which hay is cut and stacked; in other words, productive meadows that are producing hay. I have not included any other kind of a crop in this first classification, except one tract of alfalfa consisting of 4.8 acres, which was included within the classification of meadow lands and that constitutes a part of the total acreage of the first classification, viz: 3,905.8 acres. (834) By the classification "pasture land", I mean to include land irrigated under existing ditches, and from which the hay was cropped by stock which grazed within the area. The particular distinction between irrigated meadow and irrigated pasture would be that in practically every case, as I recall it, none of the pasture land was sufficiently smooth so that it could be cut by a mowing machine, and in many instances large rocks protruded from the ground, and the contour of the land was more irregular than the regular meadow land. There are also cases where considerable growth of willows and trees and brush and vegetation of that sort would not permit the land to be actually cropped. The third class irrigated sage brush is [fol. 656] land that is being irrigated to kill the sage brush and when that is accomplished and the sage brush is taken away the land can be cropped.

At the time I made a survey in 1931, there was no land coming within this classification which was not under irrigation at that time. I find the total acreage as a result of my survey of the land in the Laramie River Basin in Colorado to be 4,234.5 acres. The figures (835) just given are exclusive of Sand Creek.

The total of 4,234.5 acres includes the land that I have classified as irrigated sage brush and also includes the pasture land and irrigated meadows.

(Defendant's Exhibit "I" marked for identification.)

Defendant's Exhibit "I" is a map of the irrigated acreage under the Laramie River Basin in Colorado exclusive of Sand Creek. The North end of the map shown by the arrow here (indicating) is the Wyoming-Colorado State Line.

The double thread extending through the area represents the Laramie River; the area colored in blue or green—this is the color here (indicating) representing the meadow lands as indicated in the total which I just gave.

The area shown in yellow color—there is one here on Grace Creek, a portion near Little British Creek and a portion on the Laramie River near the Wright Ditch, which represents irrigated pasture; also a portion on McIntire Creek under Comet Ditch. The areas colored in pink are areas covered by willows and other brush within the irrigated area. Stock land is designated by the standard symbol for that designation, and that land lies near the headwaters of the Laramie River. The irrigated sage brush is shown in brown and there are two areas here (indicating) Jimmie Creek, within the Jimmie Creek area, [fol. 657] one under the Timothy Ditch and one under the Ollie Ditch. There is a small area under the Slough Creek, an area shown here at the lower end of Slough Creek. The area shown here (indicating) that is the lower end of Slough Creek.

(836) The map (defendant's Exhibit "I") correctly and accurately portray- the conditions and extent of land that has been described and the other matters concerning which I have testified as they exist in the Laramie River District and as shown directly on the original plane table sheets.

The top of the map is to the north and is represented by Wyoming-Colorado State Line and the general course of the Valley is west of north and the other end of the map represents the upper end of the Laramie River Valley; the upper end by which I mean the south end. The directions are indicated on the map by the land sub-divisions. The north point on the map and the sections are numbered, as well as the township and range lines. The left hand side of the map is to the west and the right to the east. The legend or title of the map is (837) "Meadow lands in Colorado irrigated from the Laramie River and its Tributaries. Surveyed by R. L. Downing in 1931 under the Authority of M. C. Hinderlider, State Engineer, C. R.

Rixford, Draftsman." The legend includes meadows, shown in green, irrigated pasture shown in yellow, willows shown in red, rose, swamp, the standard symbol for swamp lands, and irrigated sage brush shown in brown. At the bottom of the map defendant's Exhibit "I" is found and a location map, which is a reproduction of the United States Geological Survey quadrangle sheet for this area. On this location map, the fine lines are contours at 100 feet intervals; the blue line running down the center of the area represents the Laramie River and its tributaries; the heavy black line represents the extent of the drainage area of the Laramie River in that portion of the map and the patched areas representing the meadow lands covered by this map.

[fol. 658] The valley itself is long and narrow and at the Southern end of the Valley the contour lines are very closely spaced indicating very steep ground. The actual valley at the Southern end is only two to five hundred feet wide. As you progress north down this drainage basin on the other side the topography becomes less precipitous and in about the center of the area the meadow lands have their greatest width. In practically all cases the irrigated land lies very close to the stream, and at very near the same elevation. On either side of the irrigated area along the stream are benches whose height vary from 10 to 40 feet, and limit the productive meadows by reason of the great length of ditches necessary to divert water onto this land. (838) The land is rather even and might possible be productive providing the stones are taken from the top of the soil and water was brought to the top of these benched lands. I mean by the term bench land that it would be just the same as showing one table at this elevation in the bottom of the valley, and then adjacent to that would be a table of a higher elevation running over to the stoop land which goes up to the mountain on either side. The bench in the Northern part of the area is, in general, higher than that in the central portion of the area. Outside of the area mentioned in the Jimmie Creek drainage area, the land is rolling and much of it could be productive if sufficient water were put upon the land by means of new ditches, and the water was available.

Another area adjacent, to McIntire Creek, is irrigated from water of British and La Garde Creeks. This land

is quite steep and slopes to the McIntire Creek. The third area, which is rather small, lying between Forrester and Grace Creeks, is irrigated by a ditch from Forrester Creek, [fol. 659] known as Forrester Creek Ditch. This area is considerably above the elevation of Grace Creek and is immediately tributary (839) to that.

Most of the lands along the Laramie River lie very close to the river with respect to the thread of the stream; the greatest distance from the stream would be probably no more than a half mile in the most extreme case and there is only one where it has that great width. The areas to which I have just been referring as being more or less distant from the thread of the stream are comparatively small areas and the larger part and most of the land lies immediately adjacent to the stream flow and at very nearly the elevation of the stream. In practically all cases the slopes of the mountain rise up quite rapidly from a point very near the Laramie River and the valley is not wide, except in places I have just mentioned, which cover rather small areas and the side slopes are quite steep and precipitate. The least width of the valley would be about 200 feet, and the greatest width would probably be about ¾ of a mile.

(840) On this map (indicating) these two streams are separated by a high mountain, and there is another mountain here (indicating) that is very close to the thread of the streams. The streams to which I refer are the McIntire Creek, and the Laramie River proper. There are comparatively high mountains on either side of the stream and the drainage from either side and along the river would be brought directly into the stream, and can only find and outlet through the stream channel itself. The direction of the flow of the stream *channel itself. The direction of the flow of the stream* is to the north and west into Wyoming. There are comparatively high mountains on the east and west of this valley and on the south as well, so as to make [fol. 660] a close basin, open only to the north along the (841) stream.

In making my survey I made no special examination of the character of the soil, but I had opportunities to observe what appeared to be the general character of the soil and I would say that it was rather fallow and underlain by "coarse material" or gravel. Due to the conditions which I have just detailed as to the proximity of the irrigated

land from the stream and the character of the soil in my opinion the water could not help but return to the stream very rapidly, both on account of the cross slope and the fact that the sub-soil is so very open and porous and drains directly into the river channel. Practically all of the valley has a strong slope towards the stream. "Consumptive use" is the term used to indicate the depletion made by the use of water that has not returned to the stream.

(842) Personally, I have made no direct measurements, with respect to the consumptive use of water in soils of the nature concerning which I have just testified. However, I teach irrigation and drainage and try to read as much material along that line as possible. I have noticed in two recent irrigation texts, one by Etcheverry and Harding, and another by Israelson, that both texts refer to the duty of water and also to the consumptive use of water on land. The report of the American Society of Civil Engineers, published in 1930, among other things lists the consumptive use of water on the Little Laramie River—there are two reports on that stream—one has 9/10ths of a foot and the other an acre foot. The first is referred to as the *mien* of a twelve-year record; the second report on the Little Laramie River is a report by Mr. R. I. Meeker.

[fol. 661] Reference is also made to North Park, Colorado, which lies over the mountains to the West of the Laramie River, in which a report by Conkling and Meeker gives one acre foot as a consumptive use in that area. If those figures are correct, and they seem to be, I would say they would apply equally well to the lands along the Laramie River, since the condition of the soil and the general character of the land, and the elevation, is as high or higher as in the Laramie River Basin and might indicate some slightly less consumptive use. The growing season is about the same.

The approximate elevation of the Little Laramie is 7,300 feet and that of the North Park, 8,200 ft. And the elevation of the Big Laramie in Colorado at the State line is slightly less than 8,000 feet and goes up to an elevation (843) of about 8,500 feet at the upper end of the valley.

The authors whose names I have just referred to are considered authority in their particular field and so recognized by the engineering profession. Mr. Etcheverry and Mr. Harding are professors of irrigation and drainage at

the University of California. I am not sure of Professor Isarelson's connection, but believe he is with the Utah Agricultural College, and Mr. Meeker, of course, is consulting engineer here in Denver, but at the present time, I believe, employed by the State of Wyoming.

(Defendant's Exhibit "I" is offered in evidence.)

(844) I wish to make a slight correction in my testimony of this morning in that there is one area (on the map defendant's Exhibit "I") that is not colored which I found colored on the print. That area, however, was included in [fol. 662] my tabulation as to the acreage in the territory covered by the map and the correction merely involves the coloring of a small area on the map. Making this correction does not increase the acreage or change it in any way.

The acreage of land that is irrigated from La Garde Creek is 333.8 acres and all of which is classed as meadow lands; the acreage of land that is irrigated from waters of Jimmie Creek is 446.9 acres and in addition, 23.8 of sage brush that is in the process of irrigation.

I have not the acreage irrigated by the waters from Grace Creek, separated from Slough Creek. The ditches intermingle, in a way, but the two together have 276.7 acres of meadow, 70.9 acres of irrigated pasture and 12.8 acres of irrigated sage brush. The acreage that I have just given with respect to La Garde Creek, Jimmie Creek and Grace Creek are all included in the acreage for the different classifications of land that I gave this morning and the acreage to which I have just now testified concerning does not increase the total acreage above that which was detailed in my testimony this morning.

While making my survey of the lands in question I did not see all the ditches, but so far as I was able to observe no ditch appeared as a recent construction, all of them were (845) old. The banks were all grassed, and outside of minor repairs to structures to divert water from the stream, they give no evidence of new work. There was no indication of recent extensions or new construction of ditches, that I observed in the section covered by my survey.

Mr. Greenwood: No cross-examination.

Mr. Howell: In order that the record may be fairly straight on this question, I will again offer Defendant's Exhibit "I", since the correction has been made.

Mr. Greenwood: No objection.

[fol. 663] (846) Mr. Howell: And I will ask that the same be received in evidence.

No cross-examination.

[fol. 664] Louis L. Stimson, witness in behalf of defendant:

Direct examination.

By Wm. R. Kelly:

I am 60; reside at Greeley, Colorado; have lived (847) there continuously since birth. I am an irrigation and drainage engineer. I graduated from the Department of irrigation engineering at the Agricultural College at Fort Collins in 1892.

I operated the canal of the North Platte Land & Water Company, North Platte, Nebraska, in the summer and fall of 1893; became County Surveyor of Weld County, Colorado, in 1894 and held that position for more than one-half the years since that time. I built the Thompson Reservoir on the Little Thompson River, in Weld County, Colorado, in 1895 and '96.

I built the Lower Latham Reservoir in 1897 and 1898 in Weld County. It obtains its water from the South Platte River.

I built the Union Reservoir in 1899 and 1900. It is in Weld County and obtains its water from the St. Vrain River. In 1901 and 1902, I surveyed and built the Poudre Valley Ditch, which gets its water from the Poudre River in Larimer County, Colorado. The cost was about $700,000. In 1903, I was chief engineer for the Julesburg Irrigation project, in Logan and Sedgwick Counties, Colorado. This work was continued during 1903 and 1904, and this projects gets its water from the South Platte River. (848) In 1904, 1905 and 1906, I was superintendent of much construction of sewer work in the City of Greeley, Colorado; was City Engineer of Greeley for several years; in 1906 and 1907 was chief engineer on the Bijou Irrigation District project, which includes the entire reservoir, and inlet and outlet ditches in Weld and Morgan Counties, Colo-

rado. It gets its water from the South Platte River. In 1907 was chief engineer of the Eden Valley project, 60 [fol. 665] miles north of Rock Springs, Wyoming. This practically gets its water from the Big Sandy River, a tributary of the Grand River. In 1908 and 1909, was chief engineer of The North Sterling Irrigation District project, which cost $2,000,000. Improved the Point of Rocks Reservoir, capacity 84,000 acre feet of water, and built an earthen dam 87 feet high, and inlet and outlet ditches covering a distance of 130 miles. In 1910, survey of the South Side Project in Logan and Sedgwick Counties, Colorado. That is on the South Platte River.

In 1910 was chief engineer on the Mount Pisgah Reservoir in Teller County, Colorado. This reservoir gets its water from Four Mile Creek, which is a tributary of the Arkansas. In 1909 and 1910, built the Montezuma Valley Irrigation District Project, which is located at the base of Mesa Verde in Southwestern Colorado, and takes its water from Dolores River. In 1911, chief engineer of the Las Vegas Irrigation District Grant, at Las Vegas, New Mexico. This project takes its water from the Gallinas River. In 1909, 1910, 1911, 1912 and 1913, chief engineer of The Greeley Hydro-Electric Company, and surveyed many reservoirs and pipe lines and transmission lines for this company.

(849) In 1910, 1911, 1912, and 1913, chief engineer of The Greeley-Poudre Irrigation District, for The Laramie-Poudre Reservoir and Irrigation Company, which project is in Larimer and Weld Counties, Colorado. The project includes the West and East Side Ditches on the Laramie River and Greeley Poudre Tunnel, which is a part of these collection ditches, Mitchell Lake, 100 miles of main canal, Douglas, Cobb and McGrew Reservoirs, and 50 miles of the main laterals. The work also included the survey of Elkhorn Reservoir on the Cache la Poudre River.

From 1914 to 1923, engineer for The Greeley-Poudre Irrigation District, during which time much work was done by the District on this work, and its works are those described as being The Greeley-Poudre Irrigation District project. In 1920, was engineer for the Storms Lake Drainage District in Weld County, Colorado, and in- [fol. 666] stalled about 7 miles of tile lines. From 1925 to 1933, Chief Engineer for The Laramie-Poudre Irrigation

Company, which company owns the works of The Greeley-Poudre Irrigation District. In 1915 and 1916, built the Platte River waterworks in Weld County, Colorado. During each year of my 40 years' work, have measured many ditches and streams for the flow of water. In 1929 and 1930, I was engineer on the West Side Collection Ditch, which is the property of The Laramie-Poudre Irrigation Company, and this work was done for the West Side Construction Company. The total cost of this ditch was $123,000. From 1927 to 1929, built three district drainage works, namely, the Box Elder, East Evans and Big Bend, all in Weld County, Colorado. These three districts have a combined (850) length of drainage canals of 25 miles—cost $50,000. In my 40 years of work, I have built more than 50 small reservoirs, and installed over 300 miles of tile drain. Am at present engineer for the following ditch and reservoir companies: The Greeley Irrigation Company, The Lower Lathan Ditch Company, The Laramie-Poudre Irrigation Company, The Union Reservoir Company, The Lower Lathan Reservoir Company, The Greeley-Loveland Irrigation Company, the Seven Lakes, and South Park Water Users Association. Special engineer for the Last Chance, Nevada, and High Line Canal, South of Denver; engineer for the Worster Reservoir, and for the Wilson Supply Ditch and Sand Creek. I am a registered engineer in Colorado, and a member of the Colorado Society of Engineers.

When I mentioned the cost of $123,000 for the West Side Collection Ditch, I referred to the Lower West Side Collection Ditch, sometimes called the Lower Rawah Ditch.

The Laramie-Poudre Tunnel project consists of the East Side and West Side Collection Ditches, the Laramie-Poudre Tunnel, also what is known as the Upper Rawah or Link Ditches, which is at a higher elevation that the West Side Collection (851) Ditch. Included, also, the 14 lakes, known as Link Lakes.

[fol. 667] That $125,000 I mentioned was the amount that was expended in 1929 and 1930 in building the West Side Ditch. It was approximately 50% completed before 1929.

From my work I am familiar with the Laramie River Valley in Colorado, and the ditches thereon. I have been going on the Laramie River for 30 years past, and for the past 20 years have been actually doing work over there in

connection with the Greeley-Poudre project. I don't know that I would say I have made hundreds of trips up and down the valley, but 100 anyway.

I think in order to get a clear understanding of the Laramie River Valley, one should start outside of it, up at Cameron Pass. Just to the South of Cameron Pass is a (852) mountain known as "Lulu Mountain", and that is a mountain which possesses a characteristic which I do not think any other mountain in this territory has. If water were placed at a certain point on that mountain, a part of it would go south into Colorado and the other to California, and another part would go to the west into the tributaries of the North Platte, and the third portion would come down to the east into the tributaries of the Cache la Poudre River. Then, coming on down off that mountain, and coming to Cameron Pass, which is the pass between the Cache la Poudre drainage area and the North Platte Drainage area, in that pass are two ditches which have been constructed for the purpose of trans-mountain diversions of water, one known as the Michigan Ditch and the other the Cameron Pass Ditch, both belonging to The North Poudre Irrigation Company; and then we come to what is known as "Joe Wright Creek", which flows to the north, and comes to what is known as the "Joe Wright Reservoir". That reservoir also belongs to the North Poudre Irrigation Company.

[fol. 668] Cameron Pass Reservoir belongs to The Water Supply and Storage Company and not to the North Poudre Irrigation Company; and just above the Joe Wright Reservoir on top of the ridge to the south is what I believe is termed Zimmerman Lake, which empties its water into Joe Wright Creek. In coming past the Joe Wright Reservoir, down Joe Wright Creek, we come to what is known as Chambers Lake, which is a large storage reservoir. It belongs to The Water Supply and Storage Company. (853) Insofar as the tributaries of the Cache la Poudre are concerned, it stores water of the Joe Wright Creek, Trap Creek and Fall Creek, and some other small tributaries. It has its dam across the southeast end of the lake, from whence water is dropped into the Cache la Poudre River. Crossing the north end of this lake is a fill made by nature, before which water of this stream of Joe Wright and Trap and Fall Rivers had gone northward into the

Laramie River. No man knows just when this fill was made, but it was made either by a slide off the mountains to the West, or by the dropping of material from glaciers in by-gone days. The effect of this was to turn the waters that formerly went down the Laramie River into the Cache la Poudre. This is undoubtedly the first trans-mountain diversion of water from the Laramie River. At the north end of this lake, and at the west end of this fill that I have described, the Skyline Canal, belonging to the Water Supply and Storage Company, comes into this lake, and is the first diversion that was made from the Laramie River to the Poudre Valley. This canal is about 7 miles long and extends along the eastern side of the Medicine Bow Range. Directly across to the east from where the Skyline Ditch comes into Chambers Lake, about a half mile distant, are located Lost Lake, Larimer and Lilly Lakes, belonging to The Water Supply & Storage Company. They get their waters from the Western Slope of what is known as the
(854) Green Ridge, which extends northearly along the
[fol. 669] east side of the Laramie River for many miles. Then, as we go on down the Valley from the north end of Chambers Lake, there are numerous small tributaries that come into the upper end of this Laramie River Valley, and gradually form what is known, when we get down about five miles, as the East Fork of the Laramie River. Shortly beyond this East Fork is a large tributary which comes in from the West, known as the West Fork of the Laramie River. The West Fork supplies the major portion of water to the Skyline Canal. The Skyline Canal strikes this West Fork some three or four miles above the bottom of the Laramie River Valley, at an elevation about 1000 feet higher than where the West Fork comes into the East Fork of the Laramie River, to form the main big Laramie River. Almost immediately beyond the point where the West Fork and East Fork join, we come to the point where the West Side Collection Ditch comes into the Laramie River, and this point is about four or five hundred feet south of where the headgates to the Laramie-Poudre Tunnel are located, and at this point we find the diversion works of the Laramie River—The Laramie-Poudre Tunnel.

(855) I would say from the West Portal of the Laramie-Poudre Tunnel to the headgate of the Skyline Canal is four or five miles.

In about 1913, the Laramie-Poudre Tunnel was completed to take water from the Laramie River, and at that time there was a ditch put in across the valley to the west of the main Laramie River, the purpose of which was to intercept the flow of the West Fork of the Laramie River. This ditch extended entirely across that valley. To make it clear why this was necessary, when the West Fork comes down from the high mountain on this flat valley, it divided into a number of streams, and these streams were spread over probably a quarter of a mile, or maybe a little more, west of the main Laramie River, and it was necessary to cut these streams off and connect them to the Laramie-[fol. 670] Poudre Tunnel to send the water through the Tunnel. And in building the West Side Collection Ditch, or completing it in 1929 and 1930, it was run to the west end of this ditch that had been built across this Laramie Valley to its west side, and then the West Side Collection Ditch was built from there to Rawah Creek, the total length of this ditch being about 29,000 feet. To make it clear just what was done on this West Side Collection Ditch work in 1929 and 1930, work was stopped on that particular ditch in October, 1910, and was not again carried on until some time in June, 1929; (856) but when the work stopped in 1910 the West Side Collection Ditch was approximately half completed from Rawah Creek, which is the head of the ditch, to this point where it was delivered into the ditch that was built from the west end of the Tunnel, over across the Laramie River Valley. In building this ditch, the lines were followed, I should say, almost exactly as laid out by the company's engineers in 1909 and 1910. There is some slight variation, because it was necessary to eliminate three tunnels that were to have been constructed, according to the plans of 1909 and 1910, and the reason for this was because the work that was carried on in 1929 and 1930 was done by a gasoline shovel weighing some 37 tons, and it was impossible to take this shovel through any tunnel, and so the ditch was constructed around these tunnel sides, and in all three cases the ditch around the tunnel was built in flume; but outside of those three places, the ditch was constructed on exactly the lines laid out by the company's engineers in 1909 and 1910, and it goes to Rawah Creek at the same place that it went then.

Station 1 was the survey of the West Side Collection Ditch and for location purposes was at Rawah Creek. That is true of all maps that I have ever seen.

(857) The work that was done on the West Side Collec-
[fol. 671] tion Ditch in 1909 and 1910 was done by hand work of men, and it was not continuous, but was spread over some four or five miles of the total ditch, and when the work ceased in 1910 there were many of these sections that were not joined to each other. When the work was started again in 1929, because of the machinery used, it was necessary to start at the lower end of the ditch, which was at the point where the West Side Collection Ditch joins the ditch that was built across the valley of the Laramie River. When we put the shovel in that work, we enlarged and made the fills higher across that valley then they had been before, because we were going to run larger amounts of water, and it was necessary to have more substantial structures.

Until this West Side Collection Ditch was built we could not get our 15,500 acre feet of water. We had been operating that ditch, or that ditch and tunnel, since about 1914. I mean by the "ditch", the one that runs from the Tunnel across to the valley on the west side, and which only collected the waters of the West Fork, and, incidentally, the waters of the Upper Rawah Ditch, which came into the West Fork several miles above the mouth of the Tunnel. During all those years we have never been able to get our
(858) 15,500 acre feet of water.

I would say that Exhibit A attached to the amended Bill of Complaint of the State of Wyoming in this case, in a general way states about the location of the Tunnel system, including the collection ditches. What is there designated as "Link Ditch", is what we know as the Upper Rawah. It is a part of the Laramie-Poudre Tunnel project. What is there designated as the West Side Collection Ditch, and what is there designated as the East Side Collection Ditch, is a part of the Laramie-Poudre project. Those are the projects on which the Laramie-Poudre Irrigation
[fol. 672] Company was engaged in construction in May, 1911, at the time the former suit of Wyoming was filed against the State of Colorado, in the United States Supreme Court.

(859) In the administration of that project, and the plans and purposes of it, since I have been connected with it since 1902, there has not been any intention to exceed the diversion of 15,500 acre-feet by this Laramie Poudre Tunnel Project.

The East Side Collection Ditch is a ditch that was intended to bring water up the Laramie River from the north to the south, to the Laramie-Poudre Tunnel. There is a ditch along the western slope of this same Green Ridge that I have heretofore mentioned, as extending to Chambers Lake. This ditch as laid out is about 11 miles long, and has its head in Deadman Creek, which creek joins Nunn Creek, and forms what is known as the Nunn Creek Tributary of the Big Laramie River, and comes in at the ranch that is at present known as Sholine's, and at the place where there is a bridge across the river, and where is located an automatic device for the registering of the depth of the water in the Big Laramie River at that point, which device, as I understand, has been installed by the States of Colorado and Wyoming, and by the United States Survey.

Referring again to the map marked Exhibit A attached to the Amended Bill of Complaint, the line of the East Side (860) Collection Ditch, in a general way, is very well illustrated.

Going from the Laramie-Poudre Tunnel Project toward the Wyoming State Line, a short distance north of the Laramie-Poudre Tunnel inlet, the valley becomes wider and there has been at some time in the past some meadow lands there—they are not there now—and at a point about 1500 or 2000 feet below the inlet to the Laramie-Poudre Tunnel, the Laramie-Poudre Reservoir & Irrigation Company started the construction of a reservoir dam, and that start is shown there today in the shape of a concrete arch, and a small portion of an earthen fill dam. Directly north [fol. 673] of this place the valley becomes somewhat wider, and the first meadow ditch on the Big Laramie River comes out of the river on the west side. In fact, I think the head of that ditch is now within the reservoir site that would have been formed there if this dam had been completed. I believe the ditch is known as the Lanning Ditch, and which at one time went around the country some miles, and it has the appearance of at some time irrigating some

land, but not within my knowledge has it ever irrigated any land to produce any hay. On the east side of the river there are some small tributaries coming in from the east—I don't know what their names are—but these would have intercepted waters by the East Side Collection Ditch had it been completed. And then a short distance further north, Mill Creek comes in from the West, and it is the first creek that is intercepted by the West Side Collection Ditch; and then as we go on down the river to the north, we come to Rapid, Fall and Springer Creeks, coming from the west, and all intercepted by the West Side Collection Ditch. On the east side we find Porter and Brinker Creeks, which would have been intercepted by the East Side Collection Ditch; and where Porter and Brinker Creeks come into the Big Laramie River, we have the beginning of what is known as Middle Mountain. This mountain does curious things. It is across the channels of Porter and Brinker Creeks and across Nunn Creek, and being across those channels two of those streams were forced to the south and come out into the river on the south end of Middle Mountain, while Nunn Creek comes out at Sholine's on the main river. Now, going on down the river, from the south end of Middle Mountain, the valley becomes wider; in fact, it gets to be about 1500 or 2000 feet wide; and down in that territory at some time meadows have been irrigated by meadow ditches, but none have been irrigated within my knowledge; and then, as we go on further down we come to [fol. 674] where Rawah Creek enters the Big Laramie. Rawah Creek is the main tributary of the Big Laramie in that territory, and is the principal source of supply of water for the West Side Collection Ditch. Its head is back up in what is known as the Link Lakes. Those are the lakes I have described before as belonging to Laramie-Poudre Irrigation Company. These lakes are at an elevation of about 11,000 feet, and most of them are just at timberline, and the great snow range of the Medicine Bow rises to the south and west around these lakes and makes the best and greatest water supply (862) that there is within that territory. These peaks lying to the south and west of these lakes rise to an elevation, some of them, of more than 13,000 feet, and I have never seen them when there was not large amounts of snow on them. It was to collect the water coming down from these snows that the

West Side Collection Ditch was constructed. It means the getting of the 15,500 acre-feet of water allowed to Colorado by the Supreme Court decision of 1922.

Going on further north along the Big Laramie River, we come to quite a wide meadow, and it was surveyed at one time as a reservoir site, and was known as the Vic Stewart Reservoir site. It is also called the "Round Barn" reservoir site. The reservoir was never constructed, and no work was done except the excavation for a dugout. Coming into this basin from the west are two or three small streams. I think one of them is called Link, and supplies some water for irrigation of some meadow lands on the west side of the Laramie River. And then on the east side of the Laramie River is another Link Ditch that comes out and irrigates lands lying in this reservoir site. The Laramie-Poudre owns land there, some hundreds of acres, (863) and that tract of land is known as the Round Barn Ranch.

As we go to the north from the Vic Stewart reservoir site, the Big Laramie turns to the east and seems to cut through what we call Middle Mountain, and goes over into a valley lying east of Middle Mountain, where heretofore [fol. 675] it has been west of it; and then, after getting over to the east side of Middle Mountain it continues its way to the northwest down the valley north of Sholine's through some beautiful meadow lands that are irrigated by various ditches, and finally comes down to the point where the McIntyre Creek comes into it from the west.

The McIntyre Creek is on the west side of Middle Mountain, where the main river is on the west side, and it, too, has its head up in the Medicine Bow Mountains at this location that I have described before. Its head is in what is known as McIntyre Lake. McIntyre Lake is at an elevation of a little more than 11,000 feet, and McIntyre Creek is one of the main tributaries of the Big Laramie River. The McIntyre Valley also produces hay from ditches that have been taken out of it by early settlers, and it has its same small tributaries coming in from the west that supply additional water, besides its own supply. And then we go on down to the point where the McIntyre goes into the main Big Laramie, and this point is at the north end of Middle Mountain which ends at that point. Then we come into what might be called the Big Laramie Valley. It is

an irregular valley. The river itself is in sort of a canon, but it is wide, possibly half to three-quarters of a mile wide, and sunk below (864) the natural surface of the ground probably 100 or 150 feet deep. As you come up to the top of this rim, the Laramie Valley spreads out some miles on either side, and there are comparatively level tracts of land; but the main river itself goes on down through this depression that is 100 or 150 feet deep for some miles, and on each side of it are meadow lands which have been irrigated and produce large crops of hay. This sort of thing continues on downward for perhaps two miles, and then there comes into it from the west a creek called La Garde, and this creek also heads back from the Medicine Bow Range, but not at as high an elevation as either McIntyre or Rawah, but it heads in Shipman Park, which [fol. 676] lies right over against the main range, and is about six miles west of the main Big Laramie River, and it gets its chief water supply at this park. Then, as we get down the river from La Garde Creek, we find on the west side coming in, Forrester Creek, Grace Creek and Stub Creek, which all have their heads in the Medicine Bow Range; but as this range comes to the north it has not any elevations there above timberline, so that these creeks do not receive so much water supply as Rawah and McIntyre and the west fork of the Laramie. Coming in from the east side is Jimmie Creek, which heads up in the mountains to the south of what is known as Sand Creek Pass. Along Sand Creek Pass is a low place in the mountains which permits a road to be taken across from the Big Laramie over to what is known as Sand Creek, and this pass is known as Sand Creek Pass. As we go on down the river from these creeks we find meadows, as I have described before. Finally down at what is called the Boswell Ranch, we (865) pass the Colorado-Wyoming line about 1000 feet before we come to the Boswell Ranch. As you reach the Wyoming state line the Big Laramie Valley is very restricted. The effect of it is to very quickly bring back into the valley any excess water supplied to the hay land.

The altitude of the Skyline Canal headgate on the West Side branch of the Laramie is somewhere around 9000 to 9500 feet. The altitude of the west portal of the Tunnel

is a little more than 8500 feet; of the West Side Collection Ditch is between 8500 and 8600 feet.

The water supply on that portion of the Laramie River watershed, which is gathered by any of these trans-mountain diversions begins in the spring at varying dates, depending on the weather. At these high altitudes, of course, it continues until late in the season. Sometimes you can get water the first of April, and sometimes it will be the middle of June; it ends (866) usually about the first of [fol. 677] October. At the present time there is not much water coming because it is cold up there.

Other trans-mountain systems out of the Laramie River are the Bob Creek diversion and the Columbine diversion, the Wilson Supply Ditch, and Deadman diversion.

The Bob Creek Diversion is located near the top of this same green Ridge on the east side of the Laramie River, and about five miles north of the Laramie-Poudre Tunnel. The Columbine diversion is about in the same territory, but a little further north; the Wilson Supply and Deadman diversion is still further north, and empties water into the north fork of the Cache la Poudre at about east of Sand Creek Pass, which would be 12 or 15 miles north of the Laramie-Poudre Tunnel, at the west portal.

Starting at the upper end of the system, it takes water from Deadman Creek, which is a tributary of the Big Laramie, and by a system of ditches, cuts around the northeast side of the Deadman park, or Nunn Creek park and turns the water from Deadman drainage over into what is called Sand Creek drainage, and then that water is taken down Sand Creek itself for a ways, and then diverted through a ditch a mile long, or such a matter, over into what is known as Sheep Creek, which is (867) a tributary of the Cache la Poudre River.

I can't say how many meadow ditches are in the Laramie River Valley in Colorado. There must be 50. The lands irrigated by these ditches are all very closely adjacent to either the Big Laramie or some of its tributaries.

I presume I was wrong in my reference to a gauging station on the Laramie River on Sholine's, as being maintained by the State of Wyoming and the U. S. Geological Survey, along with the state of Colorado. The Jelm Station, I think, is in connection with the U. S. Geological

Survey, but I think the State of Colorado maintains the Sholine's.

[fol. 678] In general, the width of the irrigated portion of the valley of the Laramie River in Colorado does not exceed 1000 feet on either side of the stream. That would be what we call first bottom land, and that portion 150 feet above would be second bottom. Its greatest width would be (868) ordinarily considered very narrow. Its sides are steep.

After this water is put into the Cache la Poudre River it comes down to the headgates of the ditches owning this water. For instance, the Laramie-Poudre Tunnel system water is run down into the Poudre Valley Ditch, which head is on the Cache la Poudre River about 15 miles northwest of Fort Collins, and the Skyline water and the Cameron Pass water is run down the river to the head of the Larimer County Canal, which belongs to the Water Supply & Storage Company.

The water from the Skyline Ditch and the Cameron Pass Ditch is run down the Cache la Poudre River to the head of the Larimer County Canal, which is about ten miles northwest of Fort Collins, and this canal belongs to The Water Supply and Storage Company.

The water from the Wilson Supply ditch is run down from the north fork of the Cache la Poudre River into the Cache la Poudre River, and eventually finds its way into the Eaton, or (869) Larimer-Weld Canal.

These canals which I have mentioned are the distributing canals out of the Cache la Poudre River. I can only estimate the area to which the water is applied, probably 100,000 acres of land. Some is applied under what is known as the Greeley-Poudre Irrigation System. Its canals conduct water about 60 miles from the river. That system is the highest, or furthest north. I will change that—out of the main Cache la Poudre River, that is the highest ditch [fol. 679] north, but the North Poudre comes out of the North Fork of the Cache la Poudre and above the Laramie-Poudre Canal. Next below the Laramie-Poudre Canal on the Cache la Poudre River is the Larimer County Canal of The Water Supply & Storage Company. Next below that is the Larimer-Weld, or Eaton, Ditch.

(870) The North Poudre Company owns what is called the Fossil Creek Reservoir, and they use that in the ex-

change of water up into the North Poudre Canal, from the main Cache la Poudre River.

The Wilson Supply Ditch, or the Sand Creek Ditch water, is also used by a system of exchange under some of these other canals I have mentioned, from the Cache la Poudre River.

As to whether the Skyline Ditch water is applied to lands from canals other than the Larimer County Canals, much of it is used by exchange—that is, it comes into the system of exchange, as illustrated by Mr. McAnelly yesterday and is used on various lands by this system, covering an acreage of something over 100,000, in Larimer and Weld Counties, Colorado, Fort Collins, Eaton, Greeley, and on east as far as Crow Creek.

I have been familiar for the past 23 or 24 years with the work, plans and purposes of the appropriators of what is known as the Laramie-Poudre Project. In connection with my work as engineer for The Greeley-Poudre Irrigation District, (871) and the Laramie-Poudre Irrigation Company, during that time, I have had to do with the carrying on of its work and the application of water for use by irrigation. I would say there has been absolute continuity in the carrying on of this project. In the past 25 years it has been known as the Laramie-Poudre, the Greeley Poudre Project, The Laramie-Poudre Reservoir and Irrigation Project, and the Greeley-Poudre Irrigation District Project. During the past 25 years it has been the same project, with the same object in view, just to irrigate lands in what is now known as the Greeley-Poudre Irrigation District.

[fol. 680] The Laramie-Poudre Tunnel Project consists of four things—the East Side, the West Side Collection Ditches, two of them, the Tunnel Reservoir, and the Laramie-Poudre, or Greeley-Poudre Tunnel. The Upper Rawah Ditch and Link (872) Lakes System, are only feeders of the West Side Collection Ditch. The West Side Collection Ditch is the ditch to collect all of the waters coming to it and transmitting them to the Tunnel. The Tunnel itself collects only a little bit of seepage—in wet years as much as three feet, and in dry years a fraction of a foot. It is difficult to say as to the time of year that is. It depends on the condition of wetness over the tunnel, and up where there are some swamps and lakes and things

of that kind; I can't tell you what time of year it is, because it is at different times.

There has been continuity of work on this Laramie-Poudre Tunnel Project since 1913. From 1913 to 1917 the Laramie-Poudre Tunnel was completed and cut into from the Laramie River, and the ditch across the Laramie River was built. The length of the Tunnel is 11,256 feet. The ditch across the valley is about 1500 feet.

(873) During those years the farmers living in The Greeley-Poudre Irrigation District did work to complete what is known as the Baxter Cut, which is over on the western line of Weld County, and to connect some sections of the ditch west of there, so that the water could be run through the Pierce Lateral. They expended some $12,000 in this work. About 48 shares of the Pierce Lateral belong to The Greeley-Poudre Irrigation District, and the Laramie-Poudre Irrigation Company. That is about one-third. The enlargement right of the Pierce Lateral also belongs to the system.

From 1917 to 1922 through to the time of the decision in the former suit of Wyoming against Colorado, Cobb Lake was completed to a capacity of about 8000 acre feet. Its outlet conduit was put in as a means to get water into the [fol. 681] Larimer (874) and Weld County Canal down to Box Elder Creek. A section of the canal around what is known as Shipp Cut, up toward the upper end of the ditch, was concrete lined. The total cost of the Cobb Lake and Shipp Cut work was about $150,000.

A contract was signed between The Greeley-Poudre Irrigation District and The Laramie-Poudre Reservoir and Irrigation Company in October, 1909, for the completion of this work. This work had been started by another company, but The Greeley-Poudre Irrigation District was organized, and the contract let to this Laramie-Poudre Land Reservoirs & Irrigation Company in 1909 to complete the work. After the signing of the contract The Laramie-Poudre Reservoir and Irrigation Company put a large force of men to work on all parts of the system, including the Tunnel, and the East and West Side Collection Ditches, and out on the valley sections of the ditch, and it was not long after the start of this work that propaganda began to be put out by Wyoming to hamper this work. I recall one instance in August of 1910 that propaganda was put out

by the State Engineer of Wyoming, and (875) appeared in the Rocky Mountain News of Denver, saying that Wyoming proposed to start suit against this project if water was taken from the Laramie River in Colorado. There was other propaganda put out by various people. The effect of this was, that the sale of Greeley-Poudre Irrigation District bonds by The Laramie-Poudre Reservoirs and Irrigation Company was hampered and finally entirely stopped, so that it became impossible for that company to get money, at the beginning of 1911.

After 1911 the Company went on with the work by using their own private capital.

The former suit of Wyoming v. Colorado started in the spring of 1911, asking injunction against the use of the Tunnel and Collection Ditch System.

[fol. 682] The effect of it so far as getting money was concerned was to stop the sale of bonds. Farson Sons & Co. of Chicago, a firm, had agreed to take these bonds. After this injunction was started they could not sell the bonds and refused to take them. Then members of the Laramie-Poudre Reservoirs and Irrigation Company continued work by their private capital and spent in 1911 and 1912 four or five hundred thousand dollars of it upon the project, but their funds were exhausted.

(876) The farmers themselves in The Greeley-Poudre Irrigation District were men who did not have much credit. It was dry land, not much improved, had not much value, was bonded by irrigation district bonds for $5,100,000, about half of which bonds were issued. There were in the project 125,000 acres originally. It was cut down to 74,000 subsequent to 1922.

(877) That decision was handed down in 1922 and reorganization of the company to take over the work of The Laramie-Poudre Reservoir & Irrigation Company and The Greeley-Poudre Irrigation District was completed about the 1st of 1925. Following the Supreme Court decision in the fall of 1922 the first thing that was done was the organization of the company to carry on the completion, the Laramie-Poudre Irrigation Company. It is the owner of the system. Harvey Parker, was the president, George Smith the Secretary. The organization was made up of business men and farmers and people interested in the completion of the work. They organized it as a mutual

company to do this work, that is, the company organized not for profit, but to build up the work in which the persons' rights were represented by stock and each share of stock had a prorata share of water of the company, subject to assessment for maintenance and construction (878) and expenses of the company.

In the meantime, during pendency of that suit to enjoin [fol. 683] the Project, from 1911 to the end of 1922, foreclosure proceedings were brought against the system by the people The Laramie-Poudre Reservoirs & Irrigation Company got the money from. These foreclosure proceedings were against the Poudre Valley Canal and Douglas Reservoir and Cobb Lake and also were by lien holders whose debts arose out of construction. It was necessary, in order to get the project under way again, to find an instrumentality which could settle these foreclosure claims, and reassemble all the interests of the landowners and constructors into one legal entity. That was the object of forming The Laramie-Poudre Irrigation Company and they achieved it.

(879) The Greeley-Poudre Irrigation District got about 8000 shares. The rest of the shares went to lien claimants and mortgagee holders. The stock was used to clean up these debts. A sum of about $60,000 of stock was sold to outside people and that money spent on connecting up various parts of the plains system, constructed in 1910, 1911 and 1912. The reassembling was done after 1922. It was begun in 22 and 23 and finished in 25.

The System, now known by the corporate name, The Laramie-Poudre Irrigation Company is the continuation and successor of all the rights of the other company.

(880) Since 1923 until the present time has been spent toward completion of The Laramie-Poudre Project something over $500,000. Some of that was repair work made necessary because the system had been idle and not maintained. $123,000 was spent on completing the West Side Collection Ditch of the Tunnel System. About $5000 was spent in the Tunnel itself, because of lack of maintenance in the years it was not used for running much water.

The purpose to complete the Laramie Poudre Tunnel Project was never abandoned. Since the trial of this case in 1913, the effort has been to complete the works. All the

[fol. 684] forces have been used that were available by the limited resources of the owners, of the Project.

Beside the litigation of this former case in the U. S. Supreme Court from 1911 to 1933, other obstacles encountered in completion of the project were that after beginning of the World War in 1914 it was difficult to get money, because there was more profit in building munition factories than irrigation projects; and after the United States entered the war in 1917, the doing of anything except prosecution of the war was frowned upon. The United States wanted all the money to use in the war, so that it was impossible (881) to get money during those years. The farmers themselves were not able out of their own resources and out of the products of the soil to obtain money to construct the works during that period. All the farmers could do was to contribute work on the system, which they did. They had not lands which were improved, or resources from which they could get money to go on with the work.

In a general way, since 1922, the condition of agriculture with respect to its ability to obtain funds by means of resources outside of the products of the soil, has been that the farmers could not obtain money for any purpose hardly, let alone the construction of this work, and that condition is getting worse.

(882) From my observation from the construction of other works, in view of the obstacles this enterprise has encountered from the beginning, I would say the project has been prosecuted with all possible diligence, considering the people and the resources they had, the injunction proceedings, the World War, the general agricultural depression.

[fol. 685] It was not possible to complete this project without a substantial amount of water from the Laramie River. This project was so late that priorities from the Cache la Poudre River were practically without value, making it necessary to have water from the Laramie River. The project could not go on if it was stopped at the west portal of the tunnel, so far as collecting water is concerned or making it available for irrigation, because there would not be water to supply the land, and the whole object of the construction works was to take water for the lands for irrigation. The water running through the tunnel

would have to be obtained from the Laramie River through the Tunnel System, meaning the East and West Side Collection Ditches and the Tunnel.

(883) In the completion of the West Side Collection Ditch as a part of The Laramie-Poudre Tunnel Project, there has not been any variation made in the purpose or accomplishment of the construction. The West Side Collection Ditch was not made to take any more water or to deliver at any different place for diversion out of the Laramie River than was the plan in 1910, 11, 12, 13, 14. The line of its construction does not divert from the Rawah Creek or any of the intercepting creeks at any different points than was the plan of 1909 to 1913. In the lower part two tunnels were constructed in 1910 and the West Side Ditch runs through them. There is a 20 foot drop in the lower end of that ditch. That drop was constructed in 1910. It is exactly the same drop as was in that ditch at the former taking of testimony in the former suit of (884) Wyoming against Colorado. The line of right of way is not substantially different. There was not included in the project as it was in 1910 and 11 any other auxiliary unit as part of the Laramie-Poudre Tunnel Project. The dam of the reservoir was about 1500 feet north of the line of the west [fol. 686] portal of the Tunnel. The purpose was to discharge that water into the Laramie-Poudre Tunnel. No different purpose has been accomplished by the present construction of the ditch.

A ditch has been constructed to meet that ditch which had already been built across the valley of the Laramie-Poudre, opposite the west portal of the tunnel, and as far as the West Side Ditch has been constructed, toward that direction from the north.

About the years 1913 and 1914, the ditch was con- (885) structed across the Laramie River Valley to the West Side, and that was toward the constructed ditch of the West Side Collection Ditch.

Between 1914 and 1929 occurred the lawsuit of Wyoming, which changed the amount of water that the Laramie-Poudre Company expected to get from the Laramie River from about 70,000 acre feet to 15,500 acre feet, and therefore it was necessary to cut the construction of the Tunnel Reservoir as it would cost too much money as a conduit to the West Portal of The Laramie-Poudre Tunnel. There

was substitued, at least temporarily, the building of about 2000 feet of ditch connecting the completed portion of the West Side Collection Ditch with the ditch that had been built in 1913 and 1914 across the Laramie Valley.

The high water line of the Tunnel Reservoir as then projected is above the lower end of the West Side Collection Ditch. The water would have flowed across the tunnel reservoir and reach the same point as now. I had (886) to do with obtaining the rights of way for the tunnel system. I have seen all the maps that were filed in the U. S. Land Office, showing the right of way and the application for right of way. I myself made the map that was filed in 1917 and approved by the Land Office in 1924, which is the last map.

[fol. 687] There was not in either of those maps a difference with respect to where the water of the lower end of the West Side Collection Ditch was to lead directly into the Tunnel. I have certified copies of those maps here, consisting of four sheets.

Thereupon, maps were marked for identification as defendant's Exhibit J; sheet 1 being entitled map "Laramie Tunnel Ditches and Feeders by The Laramie Reservoir and Irrigation Company, made by Charles R. Hedke, as Engineer," signed by Watson Ziegler, as President, Wellington (887) Hibbard, as Secretary of the Laramie Reservoir and Irrigation Company, certified by C. D. Ford, as Register of the United States Land Office of Denver, Colorado, July, 1907, and approved March 29, 1909, by Frank Pierce, as Assistant Secretary of the Interior.

The other three sheets are entitled "Map of Amended Survey of Partially Completed Portions of the Laramie Tunnel Ditches and Feeders, filed April 9, 1907, approved March 29, 1909", showing it was filed December 29, 1917, with the Register of the United States Land Office at Denver, and approved May 5, 1924, by the Department of the Interior, E. C. Finney, First Assistant Secretary, showing the lines of the right of way of the original location and completed portions and partially completed portions of the Laramie Ditches and Feeders.

Mr. Kelly: These maps were accompanied by the certificate of the Register of the United States Land Office, at Denver, Colorado, dated May 25, 1923, stating: "This is to certify that the maps hereto attached, being one map

of the Laramie Tunnel Ditches and Feeders, approved March 29, 1909, and one map of the Laramie Tunnel [fol. 688] Ditches and Feeders, in three sections, May 5, 1924, are true and correct copies, and the only maps found on file in the United States Land office at Denver, Colorado, in connection with these projects."

Witness resumes:

The first of these maps, which is one sheet, shows the original filing of the Laramie-Poudre Tunnel System, (888) called the Laramie Tunnel Ditches and Feeders. It shows the line of the Upper Rawah Ditch, the Lower Supply Ditch, which is what we call the West Side Collection Ditch, and the Deadman and Nunn Creek Ditch, which is what we call now the East Side Collection Ditch, and it shows the Laramie Tunnel line.

This one (indicating) shows that the water is connected to Mill Creek and is then transmitted to the Laramie-Poudre Tunnel. The West Portal of the Tunnel was then located on the Laramie River at the mouth of Mill Creek.

Referring to the later map, being the one consisting of three sheets, it shows that the West Side Collection Ditch, and the East Side Collection Ditch both come to the West Portal of the Tunnel.

Between the two maps the actually constructed (889) location of the tunnel line was changed, so that the west end was thrown to the south, and changed its length from something over 15,000 feet to something over 11,000 feet.

This second map of the amended survey, partially completed portions of the Laramie Tunnel, Ditches and Feeders, shows what were the completed portions up to 1917. The located line of these ditches is shown by the single line, and numbers, and the portions that were completed are shown by a double line. Where it is completed, it is designated by a double line, one of which is the location of the ditch, and the other solid line to designate completed portions.

[fol. 689] (Mr. Kelly offers this Exhibit "J".)

There has been no change in the projected collecting means of the Laramie-Poudre project of the Laramie River. (890) Had the Tunnel Reservoir been built, the system, with the reservoir, would take more water from

Wyoming that does the present system, on account of the evaporation from the surface of the reservoir. The reservoir covered about 200 acres, and the evaporation off that reservoir would be much greater than it is in the three-quarters of a mile of ditch that was necessary to take the water around and through the Tunnel or reservoir site to the Laramie-Poudre Tunnel.

Mr. Greenwood: Cross-examination deferred until later.

[fol. 690] Louis E. Sholine, witness in behalf of defendant:

Direct examination.

By Mr. Shrader P. Howell:

(891) I live at Glendevey, Colorado, in the Laramie River basin and have lived there for a period of about nineteen years and engaged in ranching. I am familiar with the general conditions prevailing in the Laramie River Basin in Colorado.

(892) I would say the altitude while it varies in different sections is approximately around 8500 feet and the climate is cool nights in the summer, cool in the spring and cold in the winter; approximately about six months in winter and the average growing season varies somewhat, but is about 90 days and the irrigation season runs around 60 to 70 days. The country is mountainous on both sides of the Laramie River that rises in Colorado and which flows North in the State of (893) Wyoming. There are also mountains towards the South end of the basin and I would say that this presents an enclosed basin, except for the outlet to the North end of Wyoming. The principal crop raised in the Laramie River Basin in Colorado is hay and that is termed generally "native hay" and is raised on what is referred to as the Mountain meadow lands.

(894) The meadow land hay crop is the crop upon which the residents of the valley depend and it is the crop upon which the ranchers must rely to take care of the cattle raised in that section of Colorado.

[fol. 691] The Laramie River in the section where I live has quite a few tributaries or small streams. The width

of the valley varies, but I would say at the widest place it would be a mile—that is, meadow lands, and the narrowest portion would be about one-quarter of a mile in width. The meadow lands are located all along the main stream of the Laramie River and the tributaries that flow into it.

(895) The meadow lands run right up to the edge of and along the stream and the soil is a rich dirt on top and underneath is quite a lot of sand and gravel and that is about the condition which prevails throughout the Laramie valley in Colorado. Of course there is in some places more gravel than in others along the stream. I have found that there are several layers of gravel in the meadow lands and the top is about one foot to one and one-half feet deep, and I have dug down and found another layer of gravel under that. There is a general slope of the land that lies adjacent to the stream which makes quite a perceptible slope toward the stream. That condition prevails generally through the valley. There are some places on my ranch where the soil is two or three feet thick and other places it is not over six or eight inches. However, the soil contains more gravel in some places than in others.

(896) I believe that the character of the soil on my ranch with respect to fertility is a little better than it is further down the river toward Wyoming. The average yield per acre of native hay is about three-quarters of a ton. The only source of supply of water for growing of the crops is the Laramie River and its tributaries. The lands adjacent to the Laramie and its tributaries are watered by means [fol. 692] of ditches running from the stream.

(897) The method of irrigation that is employed in the Laramie River Valley in Colorado is what is known as the system of flooding the meadows; under that system we turn the water on the ground and run it continuously for a period of 60 days; in other words we keep the water covering the ground all that time. The 60 day period which I have just indicated is the extent of the crop growing season and of course that varies somewhat in different years. The water is usually turned on about the 20th of May and I believe it is turned on earlier further down the river by some of the ranchers and it is allowed to flow over the meadow lands during the growing season. In my section, we are further on up next to the mountains, and the snow lies on the meadows later and in the ditches later so that

those ranchers a little further south in the basin might be able to turn the water on a little earlier in the Spring than we do in the section where I live. I think the average length of time that the water is allowed to run (898) over the fields is about 60 days.

I turn the water off of my meadows about ten days before I intend to put up the hay so that the ground may dry up sufficiently so that we can get in the field with the machines. I generally figure on about the 1st of August for putting up the hay. By the flooding system I don't keep the water on my field in pools but try to keep the water moving all the time that is possible with a slight current. Of course there are places and holes in the meadow land where the water won't move and stands in a few places, but there is a slight perceptibe movement of the water across the (899) meadow lands flowing toward the river. In other words, the water flows over the land with a slight current and goes back into the stream. Aside from this surface [fol. 693] return flow water also returns to the stream by underneath seepage. The water seems to get down into the gravel and flows under the surface of the soil. I notice after I shut off my water for haying that the water will creep out along the river banks quite a while after the water is shut off.

This surplus water not actually needed and consumed in the growing of the crop comes back to the stream where it may be diverted and rediverted again by ranchers lower down the valley. There is no other place for the surplus water (900) to run, except back to the stream. When the water is first turned on at the beginning of the irrigation season it has a tendency to go into the soil and disappear to a greater extent than it does later in the season. It takes more of the water head to get over the ground to start with than at the opening of the irrigation season. I think the reason for that is the ground is drier when it is first turned on in the spring and until it gets soaked up, it naturally takes more water, and it takes time in the spring for the water table to be raised, so that after the ground is fully soaked the water is more perceptible on the surface and runs off and returns to the stream quicker.

I have lived in the Laramie River Basin in Colorado for 19 years and prior to going to that section of Colorado I lived in Larimer County, Fort Collins.

(901) I have been quite familiar with irrigation and irrigation practices for many years. In Laramie River Basin there are many irrigation ditches of various lengths, depending upon the location of the land to be irrigated and I am fairly familiar in a general way with these various ditches in that section. I go up and down the valley occasionally and I would say that the condition of the irrigation ditches in the Laramie Basin are of old construction. I [fol. 694] know of no extensions or enlargements made in the ditches in that section in recent years. In making this statement I am restricting it to the Meadow land section only.

The Greeley-Poudre has put in a ditch within the last three years, I believe, but that is not in the meadow land district.

(902) The land after the water is turned off at the close of the irrigation season, preparatory to harvesting the crop, dries very slowly and requires about ten days on my ranch before I can get in with the machines. We have no measuring devices in the ditches and the water in the spring is turned on by opening the headgates, which generally speaking, consist of just the common ordinary box made out of planks, or boards, sometimes otherwise improvised in order to meet just the particular purpose or need of the particular ditch and then when the water is turned off at the end of the irrigation season that is done by shutting down the headgates and the water then flows on down the stream. The headgates on the ditches on my ranch are made out of planks and have a sort of slashboard that may be raised or lowered and thus allow the water from the stream to flow in or cut the water off from any particular ditch.

(903) It is quite possible that some of the ranchers may not have boxes as I have described but merely open or close the ditch by making a small dam of dirt thrown in or removed at the head of the ditch.

We have no automatic measuring devices on the ditches in my section. The ditches there I would say have a shallow head. Under the conditions that I have just stated I would (904) not think it would be necessary to have automatic measuring devices installed. From my experi- [fol. 695] ence of many years as a rancher in the meadow land section of the Laramie River Basin in Colorado, I

would say that the return flow of the water to the stream is rapid.

When I speak of meadow lands I do not mean a practically level surface of green grass, such as may be found in some sections of the Middle West, but there are some rocks and willows and brush found in what we know in that section *is* the meadow lands and the land generally is more or less rolling and with a gradual slope towards the river and frequently has patches of willows growing.

(905) Running through the meadow lands there are spots covered by clumps of willows that cannot be cut and also there are some places that we call bog holes. But the condition of the ground is such that machines can not be gotten on there to cut the hay. By bog holes I mean low, swampy portions of ground. So that when I speak of mountain meadows, it means entirely different kind of meadow from what is generally understood in other sections of the country by the use of that term. When we take (906) the water out of the stream we run the ditch around to the high points of the ground and then the water flows back to the stream and it is diverted again and used by the ditches below the point where it is first diverted, so that the same water that may have been used on my land may be rediverted time and time again by other ranches on down the stream and that condition prevails all down the valley to the Wyoming State line and the amount of water that is lost by the depletion of the stream is only that amount of water which has been used up in the growing of the crops.

As I have heretofore testified at the beginning of the [fol. 696] irrigation season we turn the water on and let it flow continuously until some ten days or so before the time that the crop is to be harvested and if that plan were not followed and the water was not allowed to run continuously during the growing season, in my opinion and from my experience as a rancher the hay would stop growing and the crop would be damaged for the reason that the native hay in that section requires a great deal of moisture to produce a crop.

(907) In other words, if after the crop is started in the Spring, the water was withdrawn and not allowed to run continuously during the growing season until the crop had reached maturity the sun's rays would result in great injury and damage to the crop and it would bleach and deaden

the hay. If the water were turned off after the hay crop had started in the spring and then turned on again and left off for any considerable time, it would seriously injure the crop.

(908) For the reasons I have stated it is necessary to have a continuous flow of water after it is once put on the land in the spring.

I am to a certain extent familiar as to the climate, and altitude, and soil conditions which prevail in the Big Laramie Basin, across in Wyoming. I am not, however, familiar with the conditions that prevail in the Little Laramie district in the State of Wyoming. As to the soil in the Big Laramie Basin in Wyoming, it looks to me that it is just about the same with respect to being mixed with gravel and otherwise as is found in the Laramie Basin in the State of Colorado.

The system of irrigation that is followed in the Big (909) Laramie section, across the Colorado line in the State of Wyoming in the meadow land district is so far as I have noticed the same as our system on the Colorado side. [fol. 697] By that I mean as to the flooding system of irrigating the meadow lands by which the water is turned on in the spring and allowed to run during the irrigation season and then turned off as is done in the Laramie Basin section in the state of Colorado.

(910) The ditches on my ranch are the Brown Ditch, the Forrester Ditch, the Parker Creek Ditch—I have a half interest in that, 14 feet of water, and I have 7 feet of it—and the Davy Ditch and the Cabin Ditch, and the Stub Creek Ditch. Each and all of these ditches are decreed ditches as of dates prior to 1911, with the exception of Stub Creek Ditch which was decreed as of July 28, 1911. Each and all of the other ditches that I have named were decreed prior to 1911.

I have continuously made use of all of these ditches on my land since I have been ranching in the Laramie River Basin in Colorado.

Cross-examination.

By Mr. James A. Greenwood:

I have had other experience in irrigation than that of raising native hay, such as small grains. I would proceed

to irrigate a f. .d of small grain by turning the water on and flooding the small grain. In other words I would take the water from the main stream by a ditch around a high point of the field and let it percolate through the soil and back into the stream. And flooding as I have described it is the (911) common method of irrigating everything except where you are obliged to turn water down the rows. The two systems I refer to are the flooding system and the row system. I think I have one of the best ranches up in the meadow lands district of Colorado. It requires usually about ten days for the meadow land to dry up before a crop can be harvested and during that period of ten days the sub-surface water returns to the stream, and also after that time. Sometimes returning as much as two weeks later, or even longer, after the water has been shut [fol. 698] off from the stream. While the water is turned on the fields you could not take machinery across the field, but you could go across with a horse, or on foot.

(912) Redirect examination.

By Mr. Shrader P. Howell:

There is a very decided difference between the growing of small grain, the method of cultivation and irrigation than than employed in the growing of hay. I would say the probable effect of keeping the water on a small grain crop for two or three weeks would mean that the crop would be ruined, and it would likely result in ruin if water was kept on small grain crops for even a much less period. 24 hours would be the most we would ever keep a small grain crop covered. To keep water flowing continuously over a small grain crop for a period of sixty days would in my opinion result in there being no grain produced whatever.

It would not be practical or even possible, to successfully irrigate a small grain crop with the same method that we use to irrigate a native hay crop, nor would it be practical or possible to successfully irrigate a native hay crop in the same manner that is employed to irrigate a small grain crop. As a matter of fact we never keep the water circulating over a grain crop for any length of time.

(913) Recross-examination.

By Mr. James A. Greenwood:

While we do not keep water running across a wheat field crop, for instance, for any length of time, we do put the water on the same way by flooding the grain—that is, we run it across flooding the ground. My idea is that in irrigating a hay crop we would continuously apply the water, while with the wheat crop I would have intermittent applications, and times between applications, when the water would not be on the crop. It has been so long since I farmed a wheat crop I just don't remember how many times we did irrigate it; but that is the way we use- to irri- [fol. 699] gate wheat land, but you could not irrigate native hay in the same manner which I have just referred to as the method used in irrigating a wheat crop.

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(914) John Hohnholz, a witness in behalf of defendant:

Direct examination.

By Mr. Shrader P. Howell:

My post office address is Jelm, Wyoming and I live in the Big Laramie River Basin in Colorado, in which section I have lived for the past seventeen years.

(915) Prior to my residence in this section I lived on a ranch the other side of the Divide, in what is known as the Sand Creek Section of Colorado, where I resided for about fourteen years. My experience as a rancher in the two above named sections in Colorado has covered approximately a period of thirty years. The altitude in the Laramie River Basin in Colorado is I (916) imagine about 7800 or 7900 feet. The winter season there extends for a period of about six months with a very short growing season. The warm nights last for nearly about three months by reason of the climatic conditions this section is suitable only for a hay crop and the length of the irrigation season is about 75 days. My ranch is located at the lower end of the Laramie River Basin toward the state line, and I have an interest on the Laramie River and Grace Creek, the latter being tributary of (917) the Big Laramie River in Colorado.

The approximate length of the Laramie River Valley in Colorado is I imagine about twenty miles and it is very narrow. There are high hills and mountains on both sides of the river and the righ mountains in the South end of the [fol. 700] basin, so that the flow of the river is toward the North, running into the State of Wyoming. The Laramie River Basin in Colorado may be termed an enclosed basin with respect to the three directions which I have mentioned. One of the principal crops raised in that Basin is wild hay, which is referred to as native hay. There is also some stock raising and the stock raising business is dependent upon the native hay crop of that section. There (918) are no other crops of any moment raised in that section altho I have just a little patch of alfalfa. The principal industry is the raising of cattle and the principal crop that of native hay and the livelihood of the ranchers in the Laramie River Basin in Colorado depends entirely upon the raising of native hay which is the principal crop.

The meadow lands adjoin the river clear up to the river bank in most instances both with respect to the Big Laramie (919) River and also its tributaries. The Big Laramie River rises in that section of Colorado and it is a very active stream and its tributaries are comparatively small streams. I am familiar with the general soil conditions that prevail throughout the Laramie River Valley in Colorado. We have a kind of a sage brush soil on top of the ground, extending down approximately six inches to a foot, and gravel underneath that, coarse gravel. The soil is not very deep and this soil condition prevails throughout the Laramie River Valley. By reason of the presence of gravel in the soil it tends to make it porous and the general slope of the land is towards the stream which results in the water when the land is irrigated in flowing right back (920) down again to the stream. As a matter of fact there is no other outlet for the water in the Valley, except the stream, the Laramie River, and its tributaries.

[fol. 701] I judge that about three-quarters of a ton of hay is an average yield per acre of this native hay crop, and I think that that is an average for the whole valley, although there may be some small acreages that might produce a little more.

Our method of irrigation is to open up our headgates along about the 1st of May until the 10th or 15th of May

and let the water run over the land by what we call the flooding system. This year we are a little later in opening up our headgates on the ditches, but take the average year, we always figure on having the water on the land by the 15th of (921) May. We generally turn the water off about the 15th or middle of July, which makes the period of irrigation generally about sixty days, although there are some rare instances when it extends a little longer.

As above stated our method of irrigation is just to open up the headgates and let the water come in, although in some ditches we have no headgates at all, we just use dirt and rocks. The ditches are not very deep and when the water is turned in at about the date above mentioned in the spring it is allowed to run with the slow current over the meadow land, during the irrigation season.

(922) As a rule the ditch is constructed up as high on the ground as we consider will make hay and we have laterals out of those ditches and we distribute the water along the ditch and below we have laterals and pick up this water and carry it on to the other portions of the meadow land. If there is a section of land that is not reached readily, we plow a furrow and make a small lateral. We ordinarily start to cut our hay crop about the 1st of August and generally about one week prior to commencing to cut the crop we dry the meadow up so that we can get into the field with [fol. 702] the mowing machines. I have lived in the mountain meadow section all of my life and am very familiar with what is referred to as meadows in the middle western section of the country.

(923) The meadow lands in the Laramie River Basin have a considerable fall back toward the river and there is quite a lot of waste land by reason of the presence of growth of willows, particularly adjacent to the stream where these willows are present we do not get any crop. There are also quite a few boggy sections and frequently rocky sections in the meadow lands from which we do not get a crop of hay.

(924) I am familiar with the various ditches in the Laramie River Basin in Colorado in a general way and from my observation the ditches are of old construction and there have not been any enlargements or extension of ditches in this basin in recent years. When the water is turned on the meadows it naturally flows back toward the

stream. However, the ground takes up considerable water when first turned on the meadow lands in the spring and the slight surface current flowing over the land is not as noticeable at that time as it is later on in the season when the ground has become soaked with the water.

(925) When we first turn the water out of the ditches at the beginning of the season the ground absorbs lots of this water, and it takes a while to get the water started to going after the ground becomes saturated. After the water is turned off at the end of the season and disappears from the surface of the meadow lands there is a slow and noticeable return of the water to the stream by seepage along the river.

From my experience and observation as a rancher of many years in the Laramie River Basin in Colorado, I would say that the water returns to the stream after being [fol. 703] used upon the land under irrigation very rapidly. I have a similar knowledge with respect to the conditions that prevail in the Little Laramie and Big Laramie in Wyoming and would say that they use the flooding system the same as is used in the Big Laramie in Colorado in irrigating their meadow lands.

(926) I am not so familiar in recent years, but I know quite a few years back they never had anything except the same kind of headgates that we use in the Big Laramie in Colorado in the irrigation of the meadow lands section of the Big Laramie in Wyoming. They just turn the water on in the beginning of the irrigation season and keep it running until the close of the season and that is the same method that is being followed in the meadow lands of the Laramie Basin in Colorado and I don't think there is any difference between that method and the method that they use in irrigating the meadow lands in the Little Laramie section in Wyoming.

(927) The extent of the gravel in the Laramie Basin in Colorado varies in different parts of the valley. In some sections there is more gravel than in others, but in all the sections throughout the Laramie Basin in Colorado the soil is porous by reason of the present gravel and this permits the return of the water quickly to the stream. The meadow lands in Colorado could not be successfully irrigated except by this flooding system concerning which I have just testified by letting the water run continuously over the land during the irrigation season.

If the water were turned on the meadow lands in the spring and allowed to run, and then suddenly turned off for a period of time it would absolutely ruin our hay crop; [fol. 704] it would just naturally burn up. By reason of this condition caking the ground on top. It is necessary I consider to have a continuous flow of water over the growing season (928) for our native hay. It would be possible to successfully raise a crop of native hay by using the method of letting the water on awhile and then turning it off. There are practically no measuring devices in the ditches in the Laramie River Basin in Colorado and the fact that it returns quickly to the stream would make it unecessary to have measuring devices. On my ranch there are the following ditches: The Hance Ditch, priority number 4, out of Grace Creek. The Grace Creek Ditch, priority number 19 and Grace Creek Ditch number 28, priority number 40 and Grace Creek, second enlargement, out of Grace Creek, priority number 80. Forrester Creek Ditch, out of Forrester Creek, priority number 49; Slough Creek, out of Slough Creek, priority number 31, and I have a half interest (929) in Mansfield, out of the Big Laramie, priority number 8, and also one-half interest in the Mansfield enlargement out of the Big Laramie priority number 68, and I have used all of these ditches continuously and each of them is a decreed ditch as of date 1911.

Cross-examination.

By Mr. James A. Greenwood:

I have been a ranger in Laramie Valley in Colorado for [fol. 705] about thirty years and during all of that time have to some extent practiced irrigation and the raising of hay crops. I testified on direct examination that I did not see any need (930) of measuring or ga-ge devices in the ditch.

The officials of the State of Colorado ordered me to put a ga-ging or measuring device at the headgates of the diversion ditches that were diverting water from the Laramie River or its tributaries. We put in a kind of a box at the head of the ditch to try to measure this water through. I did not measure the water that was diverted, but the Commissioner up there measures this water.

Whether he does it, or not, I don't know, but I do know he makes his trips.

Mr. Mosier the present Water Commissioner has been at the headgates of the diversion ditches and when he is going to the ditches he stops at the ranch and he checks up on the diversion (931) of water used for irrigation. The Commissioner keeps as nearly an accurate record of the amount of water diverted as he can according to what he has to measure with. I don't know of any instrument he has to measure with, but Mr. Mosier keeps pretty close supervision over the irrigated land during the season and he knows how much land is being irrigated and about how much water is being used to irrigate the land.

Redirect examination.

By Mr. Shrader P. Howell:

I have never observed Mr. Mosier measuring the water by (932) a current meter, or any other way. I imagine he comes up about two or three times during the season to visit my ranch. What I have said in answer to Mr. Greenwood's question was just my impression as to what Mr. Mosier may have done.

[fol. 706] Recross-examination.

By James A. Greenwood:

I have been living there in the Valley and have seen Mr. Mosier there and while I have never actually seen him doing any work or anything like that, I know he has been on the ground. I never went with him to see how he did his work, but I knew he was there at various times.
(933) Mr. Mosier is the Water Commissioner in the Laramie River District in Colorado wherein my ranches are located, but I do not know whether it is District 48 or not.

C. R. Steetle, witness in behalf of defendant:

Direct examination.

By Mr. Shrader P. Howell:

I reside in the upper Laramie River Basin in Colorado, and my postoffice address is Jelm, Wyoming and I have

lived in that section for about twenty-five years. My business is stock raising and ranching and I operate the Schnitger ranch, of which there are about 960 acres and about 200 acres can be irrigated, partially. All of this ranch lies in the Laramie River Basin in Colorado. I have also lived in this Basin near the Wyoming line, but in the State of Colorado and I am familiar (934) in a general way with the Laramie River Basin section.

It has an altitude of about 6,000 feet, but of course varies to some extent in different sections of the valley.

(935) The approximate total length of the Valley from the headwaters of the Laramie down is around fifty miles. The climatic conditions vary, but there are any way six months of cold weather and during the summer the days are hot and the nights cold. The Valley is narrow and the mountains are high on both or either side of the river and the Southern portion of the Basin broadens out a little but it is practically the same, being surrounded by mountains. General direction of the flow of the Laramie River [fol. 707] is North and Northeast and flows (936) into the state of Wyoming.

The approximate width of the bottom land of the valley varies from 200 feet to a mile, I suppose and the meadow land lies close to and generally runs right up to the stream.

The principal crop in the meadow land section of the Laramie Valley in Colorado is wild hay and the industry is, chiefly engaged in by the ranchers, that of stock raising. The method of irrigation employed in this section is what is (937) known as flooding the meadows.

We just let the water out of the natural spillways and flood the land and by spillways I mean that the water is just allowed to run over the ditch bank, where the natural flow is and the land lies close to the stream. The ranchers generally commence irrigating the lands from the first to the middle of May and if it is a late season as it is this year, the water is turned on a little later, but ordinarily about the first of May. This year it was turned on about the 20th of May and generally speaking we leave the water on until about the 15th or 20th of July.

It is our method to keep the water flowing over the meadows between the date in May I have given and that of (938) July, when it is cut off the hay. There is a perceptible current as the water flows back to the stream.

Most of the meadows are narrow and the water flows towards the stream as there is no other way of course that the water could take except back to the stream. The banks immediately adjacent to the stream generally slope towards the stream, the river or tributary. It takes some little time for the water when it is first turned on in the Spring to get over the ground, because the soil is shallow, and it takes a little time to moisten up the land and until [fol. 708] the soil is filled with water there is but a slightly perceptible flow back to the stream or river. In other words, it takes a little time to get the soil saturated and that depends upon the season. If we have had a lot of moisture before the water is turned on it does not take so long for the flow back to the stream to be noticed. The return of the water to the stream I would say is rapid.

We start to harvest our hay crop about the first of August and we shut off the water about ten days before we commence harvesting in order to let the meadows dry up so we (939) can get in with the machine.

In the meadow lands there is quite a little rough ground willows and rocks, and bog holes, and this makes quite a little waste land.

(940) When we harvest our hay it is necessary of course to cut around these waste spots. I am familiar with the ditches in the meadow lands of the Laramie River Basin in Colorado and would say that the ditches are old, some of them very old. And, that there has been no recent new construction or enlargement of ditches in this section. If the water should be turned off and on intermittently on the meadow lands during the growing season of the crop it would result in drying up and stop the hay from maturing. If it dries out once it does not make any difference whether you put on the water again, you never get it back that season and it would practically (941) ruin the hay crop for that year. The system of flooding to irrigate the meadow lands is necessary in order to properly irrigate. It is absolutely necessary to have a continuous flow of water over the growing crop.

I am familiar with the general condition as to the soil and climate and conditions that prevail in the Big Laramie meadow land in Wyoming and it is practically the same that we follow on the Colorado side. The soil conditions and irrigation system in Wyoming is practically the same

[fol. 709] as that in Colorado except where there is grain and crops like that and then there is a different system of irrigating employed, but as to the meadow lands, it is practically the same.

In Wyoming they follow the system of flooding the crops and turn the water on in the spring and leave it on during the irrigation season. In the case of grain crops on the Big Laramie in Wyoming a different system of irrigation is employed, they turn the water on and give it a good flooding, and then turn it off.

The measuring devices that we have in the meadow land district in Colorado consist of a crude headgate, just a lot of boards or something that we use with respect to turning (942) the water on and off. At the end of the season they just put in some boards and rocks to keep the water from getting into the ditches. There are no regular measuring devices generally speaking in the ditches in the meadow land section.

My ranch is located on La Garde Creek and consists of 960 acres. I have just one ditch which is a decreed ditch and it is known as the Schlitger ditch out of La Garde Creek. (943) It was decreed prior to 1911, namely on May 11, 1926 for 8 cu. ft. and it has been used continuously since that date.

Cross-examination.

By Mr. James A. Greenwood:

I have lived where I now reside for a period of twenty years and during all of that time have irrigated my hay meadows as I have above described by what is known as the flood system. The water returns to the stream rapidly. After the water is turned on the meadow lands in the Spring it requires only a short time before a surface flow back to the stream can be (944) observed. If the ground is extra dry it will take longer.

[fol. 710] This year you could notice water coming back to the stream the next morning after it is turned off. This method that I have described results in the water flowing over the surface of the meadow lands back to the stream during the irrigation season. I have only crude headgates in my ditch made of boards and have no measuring devices and the Water Commissioner of my district has never requested me to put in any measuring device.

I know Mr. Mosher, the Water Commissioner and he comes and inspects my ditch and the diversion of water. I have never been up with him to the headgate, but I suppose he inspects the headgate. Mr. Mosier is on my ranch inspecting my ditch and diversion works probably every week or ten days during the (945) irrigating season. The head of the ditch is quite a ways from the house and sometimes he goes in there and I never see him. But, I generally see his car setting up near the headgate. He keeps track of the acreage that I irrigate on my ranch and the amount of water used. I have known Mr. Mosier for fifteen or twenty years. At least every since he has been Water Commissioner up there. As to his system of keeping track of the land irrigated in the valley and the amount of water diverted from the stream I would say that he is a reliable man. I don't know what he does. I am not an engineer and I don't keep track of it, but he is a reliable man and I would be inclined to believe or rely upon the record as he made it with reference to the irrigation up in that country. I have no way of knowing how much water I diverted from the La Garde Creek through my diversion works in any season. I just turn the whole ditch on and let it run.

(946) Redirect examination.

By Mr. Shrader P. Howell:

As a matter of fact, I do not know, and do not pretend [fol. 711] to know what Mr. Mosier does with respect to measuring water in ditches or keeping his records, or what his reports show. If the ranchers in the Laramie section of Colorado are unable to irrigate the meadow lands in the manner I have described by flooding the lands, it would just simply ruin the crop. The only crop that is grown there is the native hay and if that failed it would be the ruination of the stockman.

Ed Goetz, witness in behalf of defendant:

Direct examination.

By Mr. Shrader P. Howell:

My postoffice address is Laramie, Wyoming, but I live in Colorado on Shell Creek, which is located within the

basin of the Laramie River in Colorado and is in what is known as (947) the Sand Creek District.

I have lived in that section on this ranch for sixteen years, and prior to that had lived about twelve years on Sand Creek, which is in the Laramie River Basin district in Colorado.

(948) I am familiar with the method of irrigation and the practice of farming and stock-raising as it prevails in the meadow land section of the Laramie River Basin in Colorado. The approximate altitude in the meadow land section of Colorado on Sand Creek is between 7,000 and 7,500 feet. The growing season is short. I would say that the distance from the headwaters down to the Colorado line may be 30 or 35 miles and the (949) valley is very narrow, probably varying from one-quarter to three-quarters of a mile, possibly a mile at the widest. There are high mountains on either side of the Valley and they are very precipitous; there are very high mountains on the South side too. The North end is the outlet of the Big Laramie River, which flows North into Colorado from Wyoming. In the Sand Creek section in Colorado the country is more open, more flat, and the valley is wider further away from the stream than it is along the Big Laramie in Colorado. [fol. 712] And in the Sand Creek section the soil is more of a sandy loam on the surface and the sub-soil more of a clay and generally speaking, as porous as it is in the Laramie Basin proper in Colorado.

(950) I have observed the flow of the surface water and it flows back toward the stream after it has been used on the meadow lands. In the Sand Creek section so far as raising hay and growing a hay crop is concerned, you have to run the water continuously to grow much of a crop and we irrigate by flooding the meadows and keeping the water on continuously during the growing season, and if you don't keep the water on continuously you don't get any hay.

When the water is turned off for any length of time during the growing season the hay stops growing and starts to burn up, and it would not be reasonable to believe that a good crop of hay could be produced by turning the water off and then on awhile during the growing season. The hay would dry up and it does not seem to grow any more after the ground is dry and the absence of water

from the kind of soil that is found in (951) that section of Colorado would cause the soil to bake.

The meadow land in Sand Creek section may in some places be a little further from the main stream than in the Laramie River Basin in Colorado, but as a matter of fact it is usually true that the meadow lands extend right up to the banks of the stream. We turn the water on for irrigation purposes from about the first of May to the 15th, generally and let it run until about the middle of July, if it lasts that long and this (952) makes an irrigation period of approximately sixty days. The water is turned off about one week or so before the hay season commences in order to allow the ground and low places to dry up so that the machines may be gotten into the fields.

[fol. 713] The ordinary production of hay in this section is a little less than it is in the Laramie, I would say an average of about a ton to the acre. When the water is turned on in the spring in May, as I have stated, it flows continuously during the period until time to turn it off at the end of the period (953) of irrigation and this system we call flooding. We just fill the ditches and let the water run over the meadows continuously and the surplus water flows back into its natural course, and by natural course I mean from whatever source the water may have been taken; that is back to the stream from which it is diverted. After the ground is thoroughly soaked, there is almost as much in the stream below as where you have taken it out. After the ground is thoroughly soaked it does not require as much water to keep it that way if you keep the water over it at all times and the surplus flows back to the stream from which it was diverted.

I would say from my experience and observation as a ranger in the Sand Creek Basin, Laramie River Sections in Colorado that (954) the water returns to stream rapidly.

We have no measuring devices, but just the old fashioned headgate on Shell Creek. I have observed the ditches in a general way both in Colorado and Wyoming, and I would say that the ditches are of old construction and I know of no extensions or new construction that have been made in recent years in the meadow lands section.

I was born in Laramie, Wyoming and my father lived first on the ranch where I am now residing and then on a ranch in the Sand Creek Section. His name was John

Goetz. Two of these (955) ditches on Shell Creek were taken out by my father. The general soil condition and method of irrigation that prevails in the Laramie section of Wyoming in the meadow land district are the same as prevail on Sand Creek and the Big Laramie in Colorado [fol. 714] by that I mean the system of flooding the meadows by a continual flow of water from the time the water is turned on in the spring and until the irrigation season is closed.

In the Little Laramie District of Wyoming the method of irrigation is the same as in the Big Laramie in Colorado, so far as the practice of flooding the meadows continuously is concerned.

(956) You would not irrigate the grain crops the same as you would a crop of hay. You just give the grain crop a flooding and then shut off the water after it has covered the ground but you don't leave the water on continuously.

If the ranchers in the Laramie and Sand Creek section meadow lands in Colorado were unable to continue the practice of flooding on their hay crop, they would not have any crop. The ranchers would have to go out of their present occupation in the stock business. My ditches are John Goetz Ditch No. 1-2, Shell Creek Ditch and Dry Creek Ditch. They are all decreed ditches and all dated prior to 1911 and have been continuously used since that date.

Cross-examination.

By Mr. James A. Greenwood:

(957) I mean that if I were not allowed to take the extreme amount of water decreed under my appropriation, that I would have to go out of the stock business. My ranch is located farther West than the diversion works of the Divide Ditch. I do not know anything (958) about the territory of Sand Creek proper. I stated that if water was not available so that I could obtain my decreed proportion continuously that the hay crop would be lost or a failure; that same condition and result would prevail where my father ranches are on Sand Creek if he could not get the water for his hay crop.

[fol. 715] I would say that the hay crop would fail no matter where the ranch is located if you haven't any water. I do not know the number of the water district in which

my ranch is located, but I do know the Water Commissioner and his name is Mr. Mosier. He visits my ranch during the irrigation season two or three (959) times. And as near as I know of those visits he inspects the irrigation ditches. I never go with him to make the inspection. I have no measuring devices at the headgates of my ditch and do not know the actual number of acre-feet of water or second-foot of water that I divert from Shell Creek through the headgate of my ditch in any season. I assume that Mr. Mosier keeps track of it, although I have never seen his books. Mr. Mosier makes a record of the number of acres irrigated and the amount of water used.

Redirect examination.

By Mr. Shrader P. Howell:

I do not know what Mr. Mosier's records show, nor what he does with respect to measuring or failing to measure the water in any of the ditches in my section of Colorado, nor anything about what he does, except as I have heretofore testified.

Recross-examination.

By Mr. James A. Greenwood:

Mr. Mosier is Water Commissioner and as far as I know (960) he is thoroughly reliable and competent.

Wallis A. Link, witness in behalf of defendant:

Direct examination

By Mr. Lawrence R. Temple:

I have lived on a ranch in the Laramie River Valley, part of the time in Colorado and part of the time in Wyoming since 1870, and for forty years I have lived in the Laramie (961) River Valley in Colorado. I have been ranching which includes stock raising. We raise hay in the summer, cut it and put it up in stacks for the use of the stock during the winter and that is the principal occupation of the ranchers in that section of Colorado. My

[fol. 716] ranch is located in Colorado about nine miles South of the Wyoming line. I am the same Wallis Link who testified in the original suit between Wyoming and Colorado before the United States Supreme Court.

(962) The Laramie River Valley is a narrow valley, running North and South and it varies from two to three thousand feet to about one mile and is about twenty-five miles long, that is North and South. The meadow lands are located right along the stream. They border the Laramie River and its tributaries and these lands average perhaps from about one thousand feet to three-quarters of a mile in width throughout the Valley. About the widest meadow there is *is* known now as the Diamond Trail Ranch, which is located in the North side of Township ten, Range 76.

The meadows along the Laramie River extend from the River to the bluff. Now this bluff will run all the way from 50 or rather 25 to 50 feet on the West side of the River with exception of quite a few places which is quite abrupt, and mountainous and in those places where the mountain does not come down to the stream there are mesas on either side of the river. Those mesas extend out toward the shoulder of the mountain on either side, I would say around three-quarters of a mile, on either side of the river. The hay meadows, of course, lay below those mesas along the river.

(963) The meadows from which the hay is cut are pretty good meadows—they are pretty level, that is the surface is smooth. Of course they are not entirely level because all have a tendency to slope toward the stream, but otherwise the surface is quite smooth. There are some portions of the land adjacent to the stream where there are obstructions, such as rocks and trees and other like material, but those rough places while they do run down into the meadows below the ditches in some places, yet they are not meadows properly speaking, because of this roughness and those portions are too rough to be cut for hay.

[fol. 717] (964) The method of irrigation used in these meadow lands is by flooding or a continuous flow of water spread over the meadow during the growing season. This method of irrigation in the upper end of the Laramie River Valley extends for about sixty days and in the lower end it runs from ten to fifteen days longer. This flooding method

of irrigation is the accepted method for that valley and is the only method that can be satisfactorily used.

The soil condition that prevails in the Laramie River in Colorado is shallow-like soil. We haven't a sub-soil in (965) our district, but it is a light soil on top of the gravel.

I was a resident of the Laramie River Valley in the early Nineties and worked on what is known as the Skyline Ditch—about 1894. Water was turned into the ditch on the 4th of July, 1894. The head of the ditch is on the South Bank of the West fork of the Laramie River and the ditch in its course toward the Poudre Watershed intercepts other branches of the Laramie. Those branches are two and one-half mile Creek and Three-Quarters Creek just before the ditch enters into Chambers Lake. The length of the Skyline Ditch is five miles. I am acquainted with the natural lakes known as Lost Lake and Laramie Lake, and with reference to the Skyline Ditch, they are East or Northeast of Chambers Lake, and the owner of these two lakes is The Water Supply and Storage Company. These two lakes have been in operation since 1893 and I believe they have been used by The Water Supply and Storage Company since that date. They are connected with The Water Supply and Storage Company system by means of a water tunnel into Chambers Lake and that connection (966) was made in 1893. The waters of the Skyline, Lost and Laramie Lakes are used for irrigation purposes in the Poudre Valley and have been for a great many years past. I believe that the first water was taken out of Lost Lake in 1893.

[fol. 718] Cross-examination.

By Mr. James A. Greenwood:

(967) The physical connection between the Lost Lake system and the Laramie Lakes, is through Chambers Lake. Both the Skyline Ditch and the water from these Lakes empties into Chambers Lake. They are not physically connected in any other way with the Skyline water. If there had been no artificial interference with the waters that accumulate in this lake system and no ditches have been constructed connecting the lakes with Chambers Lake, the drainage would naturally go from the North end, Lost Lake, into the East Fork of the Laramie River.

In other words the water that is collected in these lakes is eventually collected into Chambers Lake and if allowed to pursue its natural course would find its way into the East Fork of the Laramie River.

(Defendant's Exhibits "K", "L", "M" and "N" are marked for identification.)

Defendant's Exhibit "K", being a duly certified copy of the Certificate of Incorporation of Larimer County Water Supply Company, filed in the office of the Secretary of State of Colorado, on the Eighteenth day of January, A. D. 1878.

Defendant's Exhibit "L," being a duly certified copy of the Certificate of Incorporation of the Larimer County Reservoir and Irrigation Company, filed in the office of the Secretary of State of the State of Colorado on the 12th day of February, A. D. 1878.

Defendant's Exhibit "M", being a duly certified copy of the Certificate of Incorporation of the Larimer County Ditch Company filed in the office of the Secretary of State of the State of Colorado, on the 26th day of February, 1881, [fol. 719] and Defendant's Exhibit "N" being a duly certified copy of the Certificate of Incorporation of the Water Supply and Storage Company, filed in the office of the Secretary of State of Colorado, on the Eighth day of August, A. D. 1891; also under the same certificate, the Certificate of Renewal of the Certificate of (968) Incorporation of The Water Supply and Storage Company, filed in the office of the Secretary of State of Colorado on the 14th day of February, A. D. 1912, and again on the 14th day of February A. D. 1933.

(Defendant's Exhibits K, L, M, and N are offered in evidence.)

[fol. 720] (969) Thereupon papers were marked Defendant's Exhibits O and P, and defendant offers in evidence Exhibit O, the same being a certified copy of the certificate of incorporation of The Divide Ditch Company, which was incorporated by Bruce G. Eaton, Benjamin H. Eaton, and Rollin Q. Tenney, acknowledged May 13, 1901, and filed in office of Secretary of State on May 24, 1901, which company acquired the Wilson Supply Ditch from its former Owners Philip Wilson, R. Q. Tenney, and B. H. Eaton, by deeds sub-

sequently introduced in evidence, and among its objections was to acquire said ditches, and to operate them.

Defendant also offered in evidence a certified copy of the original certificate of incorporation of The Divide Canal and Reservoir Company, filed in office of Secretary of State February 16, 1904, and an amendment thereto filed in the same office on April 16, 1909; also a certificate of renewal of life of said corporation, which was duly filed in the office of the Secretary of State on January 11, 1924. Briefly stated the purposes of this company was to acquire certain ditches and appropriations of water from Deadman Creek and its tributaries and Sand Creek in the basin of the Laramie river and also certain reservoirs and ditches in the valley of the Cache la Poudre river, and particularly the Columbine ditch, and the Deadman ditch, and the Divide ditch, taking waters from Sand Creek, describing each of these ditches which are the Wilson Supply system, and the appropriations of water made by each and all of said ditches, and to divert and carry the same from the valley of the Laramie river to the Valley of the Poudre river, there to be used. The articles of incorporation were signed and executed by Bruce G. Eaton, Benjamin H. Eaton, and Ellis Smith, and acknowledged the 10th day of February, 1904.

[fol. 721] (970) At this point counsel for defendant desiring to make the map preceding page 101 of Complainant's Exhibit No. 1 a part of the evidence, it was agreed that said map should be a part of Complainant's Exhibit No. 1.

The map, Exhibit No. 1, shows the entire water-shed of Sand Creek both in Colorado and Wyoming and it shows Sand Creek on the West side of the Divide and Sheep Creek on the East side, and the connecting ditch labeled Divide Ditch and Sections 22 and 23, Township 11, Range 75 W. It also shows Sand Creek, which is a part of this system from the Divide Ditch South to the North end of the Wilson Supply Ditch, located in Sections 9, 15 and 16, Township 10, Range 75 W., to the intersection of Deadman Creek, tributary of the Laramie River. This Exhibit also shows a ditch connecting with the South end of the Wilson Supply Ditch and runs Southerly through Sections 23 and 26, Twp. 10, Range 75, and is labeled "Columbine Ditch", but in fact its correct name as shown in Exhibit M-1 is "Columbine Extension Ditch", and is also the portion of the Deadman Ditch called Deadman Extension Ditch in the amended com-

plaint herein. Upon Exhibit J-1, this entire system is also shown on an enlarged map.

Exhibit 1 at the north end thereof shows Sand Creek in Wyoming with a large number of ditches taken therefrom, the same as is shown in Exhibit E-2, also introduced in evidence.

Exhibit No. 1 was prepared by complainant's witness, B. P. Fleming, and published as a part of the book, Exhibit No. 1, and shows the result of his work in the years 1902 and 1903, in the Valley of Sand Creek. Among other things he made a daily measurement of the discharge of the water in Sand Creek over the flume of the Divide or Wil- [fol. 722] son Supply Ditch situate between Sand Creek and Sheep Creek. And, the table of said measurements is found on page 119 thereof as follows:

Flow of Divide Ditch

	May		June		July	
Day	Average discharge in cubic feet per second	Discharge in acre feet per day	Average discharge in cubic feet per second	Discharge in acre feet per day	Discharge in cubic feet per second	Discharge in acre feet per day
1	.....	.....	22.30	44.16	1.70	3.37
2	.....	.....	19.20	37.91	1.90	3.76
3	.....	.....	15.00	29.70	1.20	2.38
4	.....	.....	14.40	28.62	1.20	2.38
5	.....	.....	14.40	28.40	.97	1.93
6	.....	.....	13.40	26.54	.48	.94
7	.....	.....	13.40	26.54	.20	.40
8	.....	.....	11.90	23.57	.20	.40
9	7.80	15.44	9.90	19.71	.32	.65
10	12.80	25.45	7.67	15.19	.20	.40
11	16.60	32.88	6.75	13.36	.00	.00
12	18.30	36.29	5.62	11.13	.00	.00
13	30.70	60.89	4.49	8.90	.00	.00
14	25.30	50.08	5.62	11.13	.00	.00
15	35.80	70.89	4.49	8.90	.00	.00
16	30.70	60.89	4.49	8.90	.60	1.19
17	31.30	62.07	3.31	6.54	.75	1.48
18	25.80	51.18	2.21	4.36	.75	1.48
19	22.20	44.05	2.21	4.36	.45	.90
20	18.90	37.42	2.21	4.36	.32	.65
21	16.60	32.87	2.21	4.36	.20	.40
22	17.70	35.15	2.21	4.36	.15	.30
23	16.90	33.46	1.59	3.16	.00	.00
24	16.10	31.98	1.59	3.16	.00	.00
25	16.10	31.98	1.20	2.38	.00	.00
26	20.00	39.70	1.20	2.38	.00	.00
27	24.10	46.72	1.20	2.38	.00	.00
28	22.30	44.16	1.20	2.38	.00	.00
29	23.50	46.53	2.20	4.36	.00	.00
30	22.30	44.16	1.59	3.16	.00	.00
31	21.10	41.88	.....	.....	.00	.00
Total	.....	976.12	.....	394.36	.....	23.01

[fol. 723] The witness also stated that he made measurements of the return water from the ditches on Sand Creek in Wyoming during the same year and put a table of said measurements in said Exhibit No. 1, at page 113, and states that the results of his investigation are shown on said table, which table is as follows:

"Seepage Measurements on Sand Creek"

Flow in Creek.				
Above meadow	Below meadow.	Difference	Amount being applied to meadow	Per cent of amount applied returning
Cu. ft. per sec.	Cu. ft. per sec.	Cu. ft. per sec.	Cu. ft. per sec.	
6.11	6.60	0.49	3.4	7.6
.39	2.04	1.65	1.6	95.1
.70	.72	.02	.0	....

[fol. 724] W. P. HURLEY, witness in behalf of defendant:

(971) Direct examination.

By Mr. C. D. Todd:

I am the clerk of the district court of Larimer county, Colorado, and as such I have in my possession, the records and files of said court. Am familiar with various papers, records and decrees in case No. 1885, "In the Matter of the Adjudication of Priorities of Right to the Use of Water in Water District No. 48, Division No. 1, State of Colorado," as clerk of said court. At the request of The Divide, Canal, and Reservoir Company, owner of The Wilson Supply Ditch, sometimes known as the Sand Creek System, I (972) have made a search for its statement of claim in said proceedings. About two years ago when I became clerk, I made a search at the request of Rex Eaton. We searched practically all one day for this statement and were unable to find it, and at a later date at the request of Mr. Todd and Mr. Bruce Eaton, we made a search for several hours and were unable to find these papers, in the files and records of this court.

We looked through the vault of the district court, which contains a great many maps, and a great many statements of claim. The maps are up over head in the vault, and we took every map down, and we looked over those maps, and were unable to find it. We have another vault in the base-

ment of the court house, containing files and exhibits of an early date, and I have carefully gone through all those exhibits and have been unable to find these papers. I have 'phoned and written practically every attorney some year and a half ago asking them to return all files and exhibits that they had in their possession to this office, but did (973) not recover those particular exhibits, to wit, A, B, C, D, and E.

Cross-examination.

By Mr. James A. Greenwood:

There are a great many other documents which I discovered were missing since I became clerk of the court of many of this same kind; there were quite a number of water documents. We had cards showing papers withdrawn; Mr. Fleming (now deceased) was one who had withdrawn exhibits and had not returned them. We inquired of the people at the office formerly occupied by Mr. Fleming and also of his family and also of Fred Stow, a former attorney and we were unable to recover any of [fol. 725] those files for which we had signatures. Since I have been clerk we have not lost any records or files, for the reason that I asked the Judges to make an absolute Rule that no file or exhibit should be withdrawn from the office, without the signature of one of the Judges, and now when an attorney withdraws any files, papers or exhibits, he must have the signature of one of the Judges on the withdrawal card, and if it (974) is not returned, I personally go and get it.

This is a new Rule I started two years ago when I became clerk for the reason that in checking through the files there were some 148 files missing, and I recovered 44 of those by reason of letters to the different attorneys. I do not know that the loss of these files was the result of carelessness, but I know they are gone. I have not lost any; I have been very careful of that.

Redirect examination.

By Mr. C. D. Todd:

I do not recall whether a few years ago under the orders of the court the records of these water adjudications were

ordered bound; I was not clerk then; I might state further that shortly after I was made clerk of the district court Mr. Rex Eaton came over looking for certain exhibits in case 1885, and at that time I made a thorough search upstairs and also in the basement, and in going through the vault in the office there was a steel compartment labelled "Exhibits in case No. 1885" and on opening that I found nothing in that compartment but some old blank checks; I immediately called up a former clerk and asked him about them and he did not know; there was nothing found in that particular vault.

[fol. 726] (975) R. J. TIPTON, witness in behalf of defendant:

Direct examination.

By Mr. Shrader P. Howell:

I am a resident of Denver, Colorado, and have resided there for the past four years. Prior to that time I had resided at Cripple Creek and in the San Luis Valley in Colorado, making a total residence in the state of about thirty-six years. I was, however, out of the state during the war from 1917 to 1919, and (976) was in the Republic of Mexico, during the year 1907, with my father. I was in the Republic of Mexico as Engineer for the J. G. White Engineering Corporation in 1928, and was there about one year in that capacity. My work at that time had to do with the construction of an irrigating and drainage project comprising 50,000 acres of land in the State of Tamaulipas, Mexico. My profession is that of Civil Engineer, and since September, 1929, I have been engaged as special engineer for the State of Colorado in charge of interstate rivers investigations and water resource surveys, for the State Engineer, and the Interstate River Commissioner.

(977) The first engineering position I held was for the Baca Mining Company, at Crestone, Colorado and I was connected with that company from June, 1912, to June, 1913, as surveyor and assayer. I made surveys in the mines owned by the company, made maps and had charge of the assay office. From July, 1913, to October, 1915, inclusive, I was employed by the San Luis Valley Land and Cattle

Company, owners of the Baca Grant, which is comprised [fol. 727] of 100,000 acres of land and while in the employ of that company I established gaging stations on several of the streams comprising the water supply to the lands of the company. I compiled a topographic map of the 100,000 acres tract, made a land classification survey and a preliminary lay-out for an irrigation system. In November, 1915, I attended the University of Colorado until June, 1917, when I joined the army in which service I remained until July, 1919. I entered as a private, was promoted to First Class Sergeant then to Master Engineer and later received a commission as Second Lieutenant in October, 1917. I had full charge of the triangulation work in connection with the topographic survey of Camp Kearney, and the vicinity. I was Assistant Engineering Instructor in the Officers' Training Camp at Camp Kearney and supervised construction of a number of structures in France and Germany, including fifty-two buildings in San Mihiel, France. At San Mihiel, France, I was Public Utilities Officer and as such had complete charge of the water and lighting systems, and was assigned similar duties with the army in Trier, Germany.

After I left the Army from August, 1919, to October, 1922, I was Chief Engineer of the San Luis Valley Land and Cattle Company and as such I supervised the installation of irrigation structures, and had direct charge of irrigation on the lands owned by the company, which involved the irrigation of some 7,000 acres of meadow land. (978) From October, 1922, to January, 1928, I was engaged in private practice in San Luis Valley, Colorado as Consulting Engineer, first as a partner with W. W. Reilly, and next as a member of the firm of Watrous and Tipton, Consulting Engineers.

During that time I was engineer for a number of large irrigation companies in the San Luis Valley, including the Rio Grande Canal Company, the Monte Vista Canal Company, all of which were owned and operated by the Trav-
[fol. 728] elers Insurance Company. There were about 150,000 acres of land irrigated by those companies. I was Engineer for the San Luis Canal Company and made plans for the rehabilitation of the system and also as engineer for the Mosca Irrigation District, I made an examination and report upon the condition of the reservoir which it owned.

I was engineer for the San Luis Valley Irrigation District, comprising an area of 90,000 acres of land, I prepared (979) the plans and had charge of the construction of a number of drainage systems, including the investigation, preparation of plans, and supervision of construction of a drainage system for the San Luis Valley Irrigation District, involving 50 miles of drain. I likewise prepared the plans for and supervised the construction of the system for the Morgan Drainage District, which involved the construction of 13 miles of open ditch, and the laying of 22 miles of tile. I also prepared the plans and supervised the plans for the town of Manassa, which involved construction of one mile of open ditch and five miles of tile.

I assisted in the preparation of the plans for, and assisted in the supervision of the construction of the drainage system for the Bowen Drainage District. During this same period I prepared plans for, and supervised the construction of several municipal projects, including paving, sanitary sewers and storm sewers.

I acted as consulting engineer from 1924 in connection with interstate relations on the Rio Grande River in the San Luis Valley. During that period I prepared three reports for the State, one in connection with storage and another relating to the water supply for the San Luis Valley, and the third, in connection with drainage and soil [fol. 729] conditions. In connection with this study I installed a soil laboratory for the State, and supervised the operation of that laboratory, the purpose being to determine the evaporation loss from water tables at various depths. I also made a cruise of the irrigation lands in the San Luis Valley, and prepared a map for the State.

(980) During the time I was in private practice, I made numerous reports on proposed projects, which included a report or investigation upon the proposed Conejos Reservoir, which was a 100,000 acre foot reservoir, at an estimated cost of about $1,500,000; made investigation and report on the proposed Vegas Sylvestre Reservoir, with a proposed capacity of 237,000 acre feet and estimated cost of $3,000,000.

As I heretofore testified, I went in January, 1928, to the Republic of Mexico for the J. G. White Engineering Corporation, as Designing Engineer on the 50,000 acre Rio

Mante project. I designed irrigation, drainage and road structures, and had complete charge in the field of all masonry and concrete construction. I also assisted in investigating and reporting upon two other proposed projects in Mexico in the vicinity of the Rio Mante project. About six weeks prior to the completion of the project I returned to Colorado to act as Consulting Engineer for the State, together with Mr. Meeker, in compact negotiations at Santa Fe, New Mexico between the three states of New Mexico, Texas and Colorado, involving the use of the waters of the Rio Grande.

In the spring of 1929 I made three investigations and reports involving water uses of three canal systems in the San Luis Valley. During that same year I made an investigation and report for the State of Colorado on a proposed sump drain in the San Luis Valley, estimated to cost $1,200,000. (981) This report was based upon sur- [fol. 730] veys made by my partner while I was in Mexico. I was employed by the Bureau of Reclamation during the summer of 1929 and made special water supply studies for the Boulder Canyon Reservoir. I resigned my position as engineer for the Bureau of Reclamation in September, 1929 to accept my present position with the State of Colorado.

I hold membership with the American Society of Civil Engineers, the Society of American Military Engineers, The Colorado Society of Engineers, and for the last two years I have been Secretary for the Colorado Section of the American Society of Civil Engineers; I am also on the Board of Directors of the Colorado Society of Engineers. In my present position with the State of Colorado my duties consist of making water supply studies of the various streams in the State and also the various interstate streams of the State, which involve not only the study of the water supply within the State of Colorado, but also the water supply study of those interstate streams in the states adjacent to Colorado through which those streams flow.

I make detailed analyses of water-uses, determine shortages in water supply and means for relieving those shortages, which involve the study of reservoir projects, and the study of trans-mountain diversion projects.

(982) I made for the State of Colorado a report on the Colorado River, its utilization in Colorado. This report was used by the State authorities as a basis for compact negotiations between the four upper Basin States, comprising Colorado, Wyoming, Utah and New Mexico, concerning the allocation of the waters of the Colorado River; I also prepared a report on water-uses in the San Luis Valley, and the necessity for storage and drainage, which report was used in support of a Bill introduced in the present Congress providing for the construction of the [fol. 731] so-called "sump drain" for the San Luis Valley; I also had complete charge in the San Luis Valley in Colorado of a consumptive use determination which involved a three-year period and also was in charge of an investigation to determine the water losses from a seeped area in the San Luis Valley, comprising about 120 square miles.

(983) I made investigation for the Army Engineers and prepared a report upon the water supply of the Arkansas River in Colorado, involving the uses of the water of that river and a detailed study of flood flows in the Arkansas Valley, Colorado. This investigation and studies connected therewith involved preparation of preliminary plans and preliminary estimates of a proposed $10,000,000 reservoir, which would be devoted to irrigation uses and flood control.

I am now engaged in the preparation of engineering data to be presented by Colorado in the Colorado-Kansas Supreme Court suit, involving the uses of the Arkansas River waters. I am also engaged in making a water supply study of the North Platte River in the States of Colorado, Wyoming and Nebraska, which involves not only the water supply but the uses of the water of that stream. The results of this study will be used by Colorado in compact negotiations between the three states, which involves the waters of the North Platte River.

During a leave of absence from my employment by the State I prepared a complete report on the Independence Pass trans-mountain diversion project, estimated to cost $2,000,000.00.

This report was used to support a request for a loan from the Reconstruction Finance Corporation to construct that project.

(984) My connection with the office of State Engineer of Colorado is a special position, involving the making of

[fol. 732] special investigations, and I have nothing to do with the administration of the waters of the State, as that duty devolves upon the State Engineer's office. Nor am I connected with that branch of the State Engineer's office known as the hydrographic branch.

(985) I have had experience in the irrigation of native hay meadows, particularly during the time I was with the San Luis Valley Land and Cattle Company, from August, 1919 to October 1922, I had direct charge of the irrigation of about 7,000 acres of meadow land in Colorado. I have also had occasion to investigate the irrigation of meadow lands in various sections of the state, including some of the tributaries and the headwaters of the Rio Grande River, of Saguache Creek, and have observed in a general way the method of irrigating meadow lands in North Park and in South Park, Colorado, and various other similar tributaries in the State.

In the irrigation of native hay meadows, water is turned on to the meadows in the early spring as soon as it is available usually the latter part of April up to the middle of May, depending upon the locality and the season. From that time until the end of the season the water is allowed to run on the meadows and keep them in a submerged condition. It is turned off from a week to ten days before the meadows are cut and if the meadows are cut only once the water is usually (986) turned off sometime in July or forepart of August.

In some localities with which I am familiar, the meadows are cut twice and in those localities the water is run until about the middle of June and turned off, and the hay is cut about the latter part of June, and the water is turned back on the meadows and is allowed to flow continuously until the latter part of August, when the water is again turned [fol. 733] off and the hay is cut about the latter part of August or forepart of September. I know of no other method of irrigation in connection with the irrigation of mountain meadows, that is employed in the irrigation of meadows in the State of Colorado. Native hay meadows could not be successfully irrigated by the method employed in the irrigation of grain or row crops. Several methods are used to irrigate grain and row crops, one method is the so-called flooding method, where the water is turned upon the grain and allowed to flood the field for a short

period of time, and then turned off. The grain crop may be flooded in this fashion two or three times during the season. In the irrigation of row crops, ordinarily the water is allowed to run down the furrows between the rows and to run a sufficient length of time to wet the ground and then is turned off. This process may be repeated two or three times during the season.

(987) In some sections of the state, particularly the San Luis Valley, neither grain crops nor row crops are irrigated by the flooding method, the water being run in ditches about eight rods apart, only a sufficient amount of water being allowed to run to keep the water table sufficiently high to supply water to the crops.

Row crops consist of potatoes and beets, head lettuce and other vegetables planted in rows. Grain crops consist of wheat, barley, oats, peas that are not planted in rows, but are planted by drill, although they are in rows, they are very close together. If this method were used to irrigate native hay meadows, during the interval that the water was turned off and the meadows were dried up, sometimes grass would go to seed and mature, and if the water were turned on again there would be no further growth of grass. [fol. 734] Other types of grass would dry up and there would be no further growth, and the meadows would be materially injured. This effect particularly applies to the meadows in the mountainous area where the soil is very coarse in character, and where ordinarily there is a steep gradient to the stream, and the water, when it is turned off from the meadows, runs back to the stream very rapidly from the surface of the land.

(988) In my opinion where meadow irrigation is practiced, at the headwaters of streams in mountain valleys, that irrigation has a tendency to act as an equalizer of the flow of the stream. The high peak flows in the early season are to some extent ironed out by the upper land meadow irrigation, and the subsequent release to the stream by such meadow lands of water which was held in ground storage has the effect of bringing back to the stream water in the late season, when the natural flow would be somewhat deficient.

I have acted as consulting engineer for several concerns in the San Luis Valley involving this particular problem, and it has always been the idea of irrigation companies

in that section on the lower reaches of the stream, that the upland meadow irrigation has a beneficial effect upon the stream flow. There is some depletion in the flow of the stream, but the benefits arising from the equalization effect of the meadow irrigation outweighs the actual depletion occasioned by the small consumption of the meadow lands.

I mean that during the peak flow of the river in the spring, that a portion of that water is stored in the ground and later released to go on down the stream. Of course, that effect is rather minor in character, because the acreage of meadow lands on the headwaters of these streams is rather nominal in extent, but to the extent that they do [fol. 735] exist, and *and* that their diversions are made from these peak flows during the early irrigation of these meadow lands, to that (989) extent is this effect felt. In some instances but for this storage in the ground the peak flow would be lost to the appropriators down the stream. In some instances, however, there are reservoirs sufficiently large to capture the peak flows.

I am familiar with the land in the Laramie River Basin in Colorado. In October of 1930, I made a trip through the Laramie River Basin in Colorado with Mr. Hinderlider for the purpose of looking over the Basin. I made another trip through the Laramie River Basin in August of 1931, during the time that Professor Downing was making his surveys of the irrigated lands of the Laramie River Basin, and spent three days in that section. The Laramie River Basin in Colorado is a narrow Basin running from North to South extending over a distance of 29 to 30 miles from the headwaters to the Wyoming State Line, where the Laramie River leaves Colorado. The valley itself is very narrow, and is flanked on either side by mountains which rise steeply to elevations of from nine to thirteen thousand feet.

(990) The lands that are irrigated by water diverted from the Laramie River in Colorado extend from the Wyoming State Line for about sixteen miles southward along the river. They comprise a fairly compact shoestring area, lying immediately adjacent to the streams from which they derive their water supply, separated from the streams only by a small strip of willow lands. The lands are narrow, not being greater than three-quarters of a mile in any case. They average, possibly, a half a mile in width, and have both

[fol. 736] a slope parallel with the stream, averaging probably 30 or 40 feet per mile, and a traverse slope towards the stream. They are covered by short ditches, which take out from the stream, climb to higher ground as rapidly as possible and flow in a direction parallel with the stream along the particular tract to be irrigated, and then back into the stream. These irrigated lands are rather rough in character, in some instances being cut by swales and sloughs. Some of the lands have rock within the irrigated area and clumps of willows and brush. The soil, as evidenced by arroyas, and channels cut through the land, consists of a top layer of sandy loam of rather shallow depth underlaid by coarse sand and gravel sub-soil. The valley is very narrow, and I don't think at any place it would (991) be over one to two miles wide.

I became interested in the question of consumptive use of water for irrigation in the Spring of 1924, while I was doing some special work for the State of Colorado, about which I previously testified. At that time I made an estimate of the consumptive use for lands in the San Luis Valley, and made use of an exhaustive consumptive study which had been made by Mr. Meeker, who was at that time Special Deputy State Engineer for Colorado, and since that time I have brought the studies that Mr. Meeker and I made up to date. The consumptive use investigation I made in the San Luis Valley, involved the determination of the consumptive use by 13,000 acres of land devoted to diversified crops. This study was carefully made by installing automatic recording devices to measure the inflow to the area and also the outflow from the area. The area had an effective drainage system and was so constituted that there was no underground source of extraneous water that could not be measured.

(992) In 1927, in private practice, and while acting as Consulting Engineer for the State of Colorado, a tank was [fol. 737] installed with proper devices to control the flow of water into the tank in a particular meadow in the San Luis Valley. The purpose was to determine the consumptive use by meadow lands. The tank was operated by me or under my supervision in 1927, and in my absence in 1928, by a person designated by Mr. Ralph I. Meeker. It was installed in the middle of the meadow, filled with soil from the meadow, and on top of the soil was placed sod

which was actually taken from the meadow. The water was maintained in the tank at the same level as the water in the meadows. It was turned on at the same time that the water was turned on the meadows and off at the same time. The hay was cut from the tank at the same time the hay was cut from the meadows. This particular meadow was cut twice during the season.

I took all consumptive use determinations that had been made by other investigators, and made by myself and developed the relation between consumptive use and various climatological data for use to estimated consumptive use of various areas in Colorado.

(993) When water is applied to land for the irrigation of a crop, a portion of the water is actually lost and does not return — the stream and this loss is called "consumptive use." Consumptive use is made up in some instances of two items, and in others of three items. Those items are transpiration, or the actual amount of water that is consumed by the plant during its growth. The second item is incidental evaporation, or water which is lost during the process of irrigation from the free water surface which exists if the crop is flooded, or the high water which might exist if the crop is sub-irrigated. The third item of loss, which in some instances goes to make consumptive use, is deep percolation, or the loss of water which does not get back to the particular stream system, but may get back to [fol. 738] some other stream system. This third item of loss, or deep percolation is not ordinarily a factor in old established regions, since the water table has long since been built up, and the only fluctuation is a seasonal fluctuation of the water table, lower in the winter time, and being built up again in the spring, the water which occasions the lowering of the water table going back into the stream from which it originated.

Consumptive use is affected by a large number of factors, among which may be mentioned the character of the crop, that is the production of dry matter by the particular crop, also by the character of the soil. Sterile soil occasions a higher consumptive use than fertile soil. Consumptive use is also (994) materially affected by climatological conditions, including temperature and wind movement. In regions where the temperature is high, the consumptive

use is high and where the growing season, or the frost-free period is long, the consumptive use is relatively high, because the water is applied to crops for a longer period, and the crops produce more. On the other hand those regions where the growing season, or frost-free period is short, the consumptive use is relatively low. The consumptive use may materially be affected by soil conditions. If the soil is heavy and the water is retained for an undue length of time, it causes a portion of the land to go to seep, and there is an undue evaporation loss; or, if impervious dykes run through a particular tract of land, which would have a tendency to hold the surplus back, preventing it from getting to the stream undue evaporation loss would result, which would occasion a comparatively high consumptive use. In other words, the stream would be depleted only to the extent of the water that is actually consumed in the production of the crop, together with incidental losses.

Consumptive use is the measure of depletion. There have been very few actual determinations (995) made of [fol. 739] consumptive use.

(996) (Defendant's Exhibit "Q" marked for identification.)

Defendant's Exhibit "Q" is a table, page 11, from the report entitled "Consumptive Use of Irrigation Water—in old established irrigated areas under natural or artificial drainage—R. I. Meeker, Irrigation Engineer, Denver, August 12, 1924."

(997) The table consists of twelve columns. The first column lists 18 river basins. The second gives the state in which those basins are situated. The third, the average elevation above sea level of the particular basin. The fourth column the mean annual temperature of the basin, the fifth the growing season or average number of days between killing frost. The sixth and seventh columns give the rainfall. The eighth, the headgate diversions in acre feet per acre per year. The ninth, net duty on land. Tenth, consumptive use of irrigation water per acre per year. Eleventh, area in acres of the particular project. The twelfth column gives the authority for the data given in the other columns, and remarks. This report was prepared by Mr. R. I. Meeker, then Special Deputy State Engineer for Colorado, and he is the same Mr. R. I. Meeker who has

testified as a witness in the present case for the complainant, the State of Wyoming.

(998) The first two items of the table refer to the Little Laramie River Basin in Wyoming, extending from Hatton to Two Rivers. In column 4 the mean annual temperature for the Basin is 40 degrees, and column 5 shows the growing season, or the average number of days between killing frost to be 95 days. Columns 6 and 7 show the annual rainfall to be 14 inches and the annual rainfall during the growing season to be four inches. There is no value given for headgate [fol. 740] (999) diversion, nor for net duty on the land, but a note appears in columns 8 and 9 which pertain to those two features, which states "chiefly meadows. Heavily flooded compact area." Column 12 shows that the consumptive use of irrigation water in acre feet per acre per year of the Laramie River under item 1 is one acre foot per acre. Column 11 shows that the area involved in the investigation is 28,000 acres, and a note under column 12 states: "R. I. Meeker—three years' record (1912-13-14), Laramie River investigations. Automatic records of water above and below. Irrigated area determined from reconnaissance survey". The elevation, mean annual temperature, growing season, rainfall, shown in columns 3, 4, 5, 6 and 7, are the same as shown in item number 1. The same note appears in columns 8 and 9, which pertain to headgate diversions and net duty, this note being "chiefly meadows, heavily flooded compact areas." Column 10 shows consumptive use of irrigation water nine-tenths of an acre foot per acre per year. The note in column 12, referring to item 2, states "12 year record, 1912-1923, inclusive, includes some waste into Big Basin by Park Ditch. Automatic gage upper station, 1912-1914. Automatic gage lower station, 1913-1923.

(Defendant's Exhibit R marked for identification.)

(1000) (Defendant's Exhibit R is a graph appearing on page 7 of the report, of consumptive use of irrigation water by R. I. Meeker concerning which the witness just testified.)

This graph was prepared by R. I. Meeker, Engineer, March 25, 1924, to determine consumptive use of irrigation water and consists of a cross section with a scale at the lower side of the graph, the title of the scale being,

"Consumptive Use of Water—Acre Feet per Acre per Year." The scale ranges from zero on the left to 3.5 acre [fol. 741] feet per acre per year on the right. Each small division represents one-tenth of an acre foot per acre per year. The larger heavier lines, below which the number appears, represent one acre foot per acre per year, two per year and three per year. On the left side of the graph appears a scale entitled "Mean Annual Temperature." This scale ranges from 30 degrees at the bottom up to 80 degrees at the top. Each small division represents two degrees in temperature. Upon the graph has been plotted the information which appears in column 4 and in column 10 of defendant's Exhibit Q, that information being the mean annual temperature, as shown in column 4, and the consumptive use as shown in column 10. A line has been drawn upon the graph to average the points which resulted from this plotting process and is designated, "Consumptive Use," and shows the relation between consumptive use and mean annual (1001) temperature. If the relation between the mean annual temperature and consumptive use, as shown by the graph is correct, that would indicate that the consumptive use in a region where the mean annual temperature is 40 degrees or less would be less than one acre foot per acre, assuming that there is effective drainage, either by natural or artificial means.

(1002) This table and graph, Defendant's Exhibit Q and R, were prepared by Mr. Meeker in the spring of 1924. Since that time I have made investigations concerning the consumptive use of water. Since then I have determined the relation that existed between consumptive use of irrigation water, plus precipitation, during the growing season, or frost-free period, and the length of the frost-free period, using that as a basis instead of mean annual temperature. I have also had available, the results of several other consumptive use determinations, as well as the results of the consumptive use determinations that I myself had made. I prepared a graph which showed the relation between consumptive use of irrigation water, plus precipi- [fol. 742] tation during the growing season, or frost free period, and the length of the frost-free period. This particular graph that I prepared, to which I have just testified, was prepared in the fall of 1929 and the spring of 1930. In 1930, 1931 and 1932, I made a three-year consumptive use

determination in the San Luis Valley, concerning which I have just testified. The consumptive use determined by that investigation varied from the amount as estimated from my curve by less than 2%.

(1003) Upon the relation which I found to exist between consumptive use and various climatological data, it is my opinion that the amount or value of consumptive use in the meadow lands of the Laramie River Basin in Colorado, is less than one acre foot per acre, and probably ranges between .7 and .9 acre feet per acre. If a very small amount of water were diverted on the land which would reduce the production of hay, the consumptive use, of course, would be somewhat less. If sufficient water were diverted to decrease production of hay by injuring it and drawing it out the consumptive use would be somewhat lessened. Between those two ranges, in my opinion, the amount of the diversion would not change the consumptive use, except immaterially. The consumptive use in that Basin is made up of two items, transpiration, the amount of water which the hay requires to grow; and incidental evaporation, or the evaporation which occurs from free water surface maintained over the meadow land. The evaporation from the free water surface would be the same regardless of the amount of water that is diverted because there is a free water surface maintained over the land throughout the irrigation season, (1004) and whether the water is two inches deep or two feet deep, the evaporation from that would be the same. The evaporation would not be affected in any way by the amount of water that is flowing over the land just [fol. 743] as long as there was a free water surface maintained. In other words, so long as the production of hay remain the same, transpiration would be the same, and so long as there was free water surface, the evaporation would be the same, so that the consumptive use would not be affected in any way by the supplication of water, assuming that there are no marginal areas that are seeped by the surplus waters. The altitude of the meadows that are irrigated in the Laramie River Basin in Colorado varies from 7700 feet above sea level at the Wyoming State Line, to about 8300 feet above sea level at the upper end of the irrigated area. The mean altitude of the irrigated area is about 8,000 feet above sea level. The mean annual temperature in that portion of the Basin covering the land

irrigated is about 38 to 39 degrees and the frost free period is about 60 to 75 days. These latter items are determined from an investigation of the records maintained by the weather bureau stations in the vicinity of the Laramie River Basin in Colorado. The precipitation during the irrigation season probably ranges between three (1005) and four inches, as determined from the records in the vicinity of the Basin.

By referring to Defendant's Exhibit R, which is the graph prepared by Mr. Meeker to show relation between consumptive use and mean annual temperature, it is indicated that a consumptive use where the mean annual temperature is 38 degrees is .7 of an acre foot per annum, if the relation as shown on the graph is correct. Using the graph which I prepared showing the relation between consumptive use of irrigation water, plus precipitation during the frost-free period, and the mean period between killing frosts, I find that with a mean frost free period of 60 days, the consumptive use of irrigation water is about 1.03 acre [fol. 744] feet per acre. If the precipitation during the irrigation season is four inches, that would leave the consumptive use of irrigation water at .7 of an acre foot. If the precipitation is three inches, the consumptive use would be .78 of an acre foot. If the frost-free period is 75 days, my graph indicated that the consumptive use of irrigation water plus the precipitation during that frost-free period, would be 1.21 acre foot per acre and subtracting the precipitation from that leaves .88 to .96 (1006) of an acre foot per acre. Referring further to the experiments that were made in the San Luis Valley in Colorado to determine the consumptive use of the water in the meadow lands there where the altitude is about 7600 feet, the mean annual temperature is 42 degrees with a frost-free period of 105 days, in the months of May and June, 1928, the period during which the water was run on the meadows for the first cutting of hay, the consumptive use of irrigation water was .61 of an acre foot per acre. The consumptive use of irrigation water, was .74 of an acre foot per acre, July and August prior to second cutting of hay. During the year 1927 our apparatus did not work effectively during the first irrigation, but was adjusted and worked well during the second period of irrigation from July to August. The consumptive use of irrigation of water during that period,

July and August, 1927, prior to the second cutting of hay, was .76 of an acre foot per acre for a period of 62 days' run of water.

(1007) In 1927 a special committee was appointed by the chairman of the Irrigation Section of the American Society of Civil Engineers to investigate and report upon the consumptive use of water in irrigation. The report of that [fol. 745] committee is found on pages 1349 and 1377 of Volume 94 of the Transactions of the American Society of Civil Engineers, the date of the volume being 1930 and the title of the report is "Consumptive Use of Water in Irrigation".

On page 1376 of this report a graph is printed by the committee as a measure of consumptive use. This graph shows the relation between consumptive use and what is termed "Heat available during the crop year." The heat available during the crop year in the Laramie Valley in Colorado is determined by use of the records that have been maintained at Centennial, which is in the Laramie Valley, and is at an elevation of about 8,000 feet, which elevation is about the same as the irrigated lands in the Big Laramie River Basin of Colorado, and by similar use of similar records at Walden, which is in North Park on the other side of the mountains, (1008) and has an elevation of about 8,000 feet. By determining the heat available during the crop year from these records and using this graph, the water consumption in the Laramie Valley of Colorado, indicated by consumptive plus precipitation becomes something less than 1.2 acre feet per acre. If from that value is subtracted the precipitation during the crop season the consumptive use of irrigation water becomes about .88 per acre foot per acre, if the precipitation during the crop season is four inches.

Mr. Meeker, in his investigation, found that the consumptive use becomes less as the mean annual temperature becomes less. I found in my investigation that consumptive use becomes less as the free-frost period becomes less in length. If other conditions are the same in the Laramie River Valley in Colorado and the Laramie River Basin in Wyoming, as to soil conditions and ease with which surplus water returns to the stream, the consumptive use of the water in the Laramie River Basin in Colorado [fol. 746] would be less than the consumptive use in the

Little Laramie River Basin in Wyoming, because both the mean annual temperature and the frost free period are less in the Laramie River Basin in Colorado than in the Little Laramie River Basin in Wyoming, due to the higher altitude of the irrigated land.

In my opinion 4,250 acres of meadow land in the Laramie River Basin in Colorado could not be successfully irrigated by 4,250 acre feet of water, headgate measurements.

(1009) (Defendant's Exhibits Q and R offered in evidence.)

Referring to the report of the American Society of Civil Engineers for 1930, concerning which I have heretofore testified and particularly to page 1376 of that report, it will be observed that the heat available during the crop year for the Little Laramie Basin in Wyoming as indicated on the graph by points 1 and 2, was not determined for the actual irrigation season of the hay land, but extended for a longer period. In using the graph to determine the consumptive use of the water in the Laramie River Basin in Colorado, I determined the heat available during the crop year for the same period of time as was used to determine the heat available in the Little Laramie River in Wyoming, as shown on the graph, but did not confine myself to the actual irrigation season on the Laramie River Basin in Colorado.

(Cross-examination deferred.)

[fol. 747] ALVIN KEZER, witness in behalf of defendant.

Direct examination.

(1010) By Mr. Shrader P. Howell:

My name is Alvin Kezer; I have been a resident of Fort Collins, Colorado, for 24 years and am Professor of Agronomy and Agronomist of the Experiment Station of the State Agricultural College, Fort Collins. The Experiment Station is operated in (1011) connection with the United States Government. I graduated from the University of Nebraska in 1904, degree of Bachelor of Science; was employed by the Bureau of Plant Industry, United States De-

partment of Agriculture, stationed at Lincoln, Nebraska from 1904 to 1906; received degree of Master of Arts, with major in Agronomy and minors in Chemistry and Botany; graduate work at the University of Illinois, majoring in Soils; graduate work at Cornell University in 1908, majoring in Soils; graduate work Michigan Agricultural College, 1912; in charge of the Soils Department, University of Nebraska, 1906 to 1909; during which time I completed work at that time required for degree of Doctor of Philosophy; report of agricultural geology of Nebraska, written jointly with Dr. George E. Condra, published in 1907, and in the same report published an article on "Soil Management" for Nebraska conditions; report in 1909 published by Nebraska State Board of Agriculture on Soil Management. In June, 1909, I became Professor of Agronomy and Agronomist in the Experiment Station at the Colorado State Agricultural College, which position I have occupied continuously to the present time. In 1912, 1913 and 1914 I published jointly with V. M. Cone a study of the irrigated condition in the San Luis Valley. This is Bulletin 209, published in 1915 by the Colorado Experiment Station. The published bulletin was the result of three years experiment on the Costilla Estates. From 1910 to 1915 I carried on irrigation experiments in Grand County, Colorado, on the ranch at that time owned by Ex-Governor E. M. Ammon of Colorado. The [fol. 748] elevation of this ranch is from 7600 to 8200 feet. The geological formation of the property referred to is an old fresh water lake and when the water receded by means of the Colorado River, the lake was drained off leaving a number of beaches, which are now locally called mesas and which go in steps from the bottom lands of the Grand River back to the mountains, the elevations being from 50 to 200 feet from the surface of one to the surface of the next. I (1013) have had immediate charge of the irrigation of the agricultural lands of the State Board of Agriculture in connection with my duties as Professor of Agronomy, and in that capacity I have carried on investigation work in Grand County, on the east edge of the San Luis Valley and the farm irrigation at Fort Lewis near Durango, and until 1932 I had charge of the irrigated experimental farm near Rocky Ford. I have been on the so-called meadow lands in the Laramie (1014) River Basin in Colorado. The topographic conditions of the Laramie River Basin might be

Little Laramie River Basin in Wyoming, because both the mean annual temperature and the frost free period are less in the Laramie River Basin in Colorado than in the Little Laramie River Basin in Wyoming, due to the higher altitude of the irrigated land.

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(Cross-examination deferred.)

[fol. 747] Alvin Kezer, witness in behalf of defendant.

Direct examination.

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partment of Agriculture, stationed at Lincoln, Nebraska from 1904 to 1906; received degree of Master of Arts, with major in Agronomy and minors in Chemistry and Botany; graduate work at the University of Illinois, majoring in Soils; graduate work at Cornell University in 1908, majoring in Soils; graduate work Michigan Agricultural College, 1912; in charge of the Soils Department, University of Nebraska, 1906 to 1909; during which time I completed work at that time required for degree of Doctor of Philosophy; report of agricultural geology of Nebraska, written jointly with Dr. George E. Condra, published in 1907, and in the same report published an article on "Soil Management" for Nebraska conditions; report in 1909 published by Nebraska State Board of Agriculture on Soil Management. In June, 1909, I became Professor of Agronomy and Agronomist in the Experiment Station at the Colorado State Agricultural College, which position I have occupied continuously to the present time. In 1912, 1913 and 1914 I published jointly with V. M. Cone a study of the irrigated condition in the San Luis Valley. This is Bulletin 209, published in 1915 by the Colorado Experiment Station. The published bulletin was the result of three years experiment on the Costilla Estates. From 1910 to 1915 I carried on irrigation experiments in Grand County, Colorado, on the ranch at that time owned by Ex-Governor E. M. Ammon of Colorado. The [fol. 748] elevation of this ranch is from 7600 to 8200 feet. The geological formation of the property referred to is an old fresh water lake and when the water receded by means of the Colorado River, the lake was drained off leaving a number of beaches, which are now locally called mesas and which go in steps from the bottom lands of the Grand River back to the mountains, the elevations being from 50 to 200 feet from the surface of one to the surface of the next. I (1013) have had immediate charge of the irrigation of the agricultural lands of the State Board of Agriculture in connection with my duties as Professor of Agronomy, and in that capacity I have carried on investigation work in Grand County, on the east edge of the San Luis Valley and the farm irrigation at Fort Lewis near Durango, and until 1932 I had charge of the irrigated experimental farm near Rocky Ford. I have been on the so-called meadow lands in the Laramie (1014) River Basin in Colorado. The topographic conditions of the Laramie River Basin might be

compared to a trough with very steep sides with the river at the bottom of the trough. Along the banks of the river are narrow bottom lands or benches on which these meadows are located. The benches lie above the river; the surface soil is usually a sandy loam, made of coarse grained particles through which water passes very readily. The sandy loam soil, which is rather thin, is underlain by gravel and rubble, which in turn rests on top of the bed rock. Such soil condition not only permits but forces a rather rapid drainage of any excess water in the lands back into the river at the bottom of the trough. Generally speaking, throughout this valley the slope is steeper toward the river than it is parallel with the stream. Referring to the benches or bottom lands, geologically they are what are known as out-wash fans deposited from streams that come into the river from the side. As these streams approach the Laramie the velocity of the water is slowed down and the eroded material is deposited, making a fan shape deposit at [fol. 749] the mouth of the gulch. These bottom lands may also be from deposits (1015) of the river meander after hight water subsides. The out-wash fan so-called is formed by rather coarse material carried down the steep slopes to a point where the velocity lessens, when part of the material is dropped and deposited forming a fan shaped area. This soil is very porous on account of the rather coarse material and causes a free movement of water flowing through it.

An Agronomist is one who carries on work with field crops (1016) and soils. Literally, it means to manage the field and in actual practice it means soils and the crops grown on the soils.

With reference to lands in the Laramie River Basin, I would say that water is usually turned on for irrigation about the (1017) middle of May. Some years it may be earlier and some years a little later, depending on the temperature and perhaps the snow covering, and in the ordinary season the normal close of the irrigation season would be from the middle part to the latter part of July, making a (1018) normal season for irrigation of from 70 to 80 days. The ordinary method of irrigation in this valley is by turning water onto the lands and keeping them saturated until about time to cut the hay, when the water is turned off and is allowed to drain back into the stream. The reason

for this sort of irrigation is that the soils are so very porous that it is necessary to keep the water on the lands almost continuously in order to have contact with the grass roots. If water were turned off more than a very few days, it would retard the growth of the grass because there would not be sufficient water in the main soil to permit any extended growing period, and it would result in a stunting and might cause permanent injury because the grass partially dries up. This would affect the tonnage of the hay. (1019) The water applied to the lands in irrigation would return fairly rapidly because of the fact that the benches are more or less cut with gullies and the soil is very porous. Only a few days elapse between the time when water is turned off until [fol. 750] the land is dry enough to permit the cutting of hay.

It is my opinion that most of the water used on the lands in the Laramie River Basin return very soon to the stream and it may be again diverted for use lower down. Owing to the fact that the bottom lands are narrow and very porous, the depletion to the stream by reason of the use water on these meadow lands in Colorado would be largely the amount of water required to produce a hay crop. This would be manifested in three particular ways: First, the amount of water evaporated from the surface of the land, the water flowing over it; second, the amount of water transpired by the growing plants; and third, the amount of water (1020) which is actually built up into the plant tissue. These three uses constitute the consumptive uses of the water. The larger portion of the water diverted and not used in this way would return to the stream and that return would include both surface and subsoil return.

There are two technical terms which are used in connection with the water where irrigation is practised, one is "consumptive use", which use I have just described, and the other is "farm consumptive use". Consumptive use consists of the water in acre feet applied per acre and used by the plant and evaporated from the surface. Farm consumptive use is the same as consumptive use plus a (1021) loss by deep percolation. In these particular meadows the loss by deep percolation is practically nothing for the reason that bed rock lies close below and the river is at the bottom of the slope of the bed rock. In other words, the consumptive use of water in the Laramie Valley is the amount

of water which is consumed in the production of the crop and that marks the extent of the depletion of the stream. There is little, if any, loss to the stream by deep percolation because of the geological condition which I have just described.

Experiments have been carried on in Colorado which [fol. 751] show the amount of water required to produce a pound of dry matter in (1022) a crop. These experiments were carried on at Akron, Colorado, by Mr. Lyman J. Briggs and Homer L. Shantz during the period from 1911 to 1917, inclusive, under the authority of the Bureau of Plant Industry of the United States Department of Agriculture. Dr. Shantz has since become president of the University of Arizona, and Dr. Briggs is now, I believe, Chief of the Bureau of Standards of the United States Government. The result of those experiments were published in ways, in Bulletins 284 and 285 of the Bureau of Plant Industry and also in Volume 34, No. 12, of the June 1927 issue of the Journal of Agricultural Research, a scientific journal published by the Secretary of Agriculture. I saw these experiments while they were under way, and I have seen the reports and have (1023) prepared a table for certain crops which might be compared with the Laramie River crops, with an average water requirement for alfalfa, barley, wheat, millet and grama grass. The result shows the average water requirement for alfalfa, which is the highest requirement of any of the crops, to be 859 pounds of water to produce a pound of dry matter, and by water requirement I mean the amount of water used by the plant, evaporated from the soil and built up into the plant tissue; for two different varieties of oats, Swedish oats, 602 pounds of water; Burt oats, 601 pounds of water; (1024) for barley, 511 pounds; for wheat 484 pounds; for millet, 273 pounds; for grama grass, 343 pounds. These figures mean that in order to produce a pound of dry matter in a crop for each of the crops named, it requires the number of pounds of water in each respective (1025) case. The evaporation of water from free surface during the term of the experiment was from 48.8 inches in 1911 to 33.4 inches in 1915, and I think the condition prevailing at the point of the experiment at Akron, Colorado, would compare rather favorably with the conditions in the Laramie River Valley. Akron is nearly 4000 [fol. 752] (1026) feet lower than the Laramie Valley;

it has a much longer season and the temperatures rise very much higher, and consequently the evaporation and transpiration are likely to be much higher. We can be certain that the uses cannot be higher in the Laramie River Basin than at Akron, and in all likelihood would be considerably less. I have made comparisons based on the amount of water required to produce a pound of dry matter and have made one supposition on the amount of water, and the rest of my comparison is based on the actual Akron figure. I would take 1000 pounds of water as a requirement to produce a pound of dry matter. This amount being greater than that for any of the crops I have named. With that figure and assuming a ton of dry matter as the average actual crop, it would require .73 of an acre foot to produce that ton of dry matter, transpired by the crop and built into the plant. If (1027) we take 343 pounds of water as the average consumed for grama grass, which is somewhat comparable with the mountain grasses, it would require .251 acre feet. These figures I consider to be perfectly fair and that it is correct to say that the figures show as high a requirement as necessary in the Laramie River Basin.

In the irrigation of the small grain crop in northern Colorado, the method known as open flooding method is generally (1028) used. This method consists of flooding the crop until the soil, in the opinion of the irrigator, is sufficiently wet and then the water is turned off for a period. This method of flooding is intermittent and is carried on during the growing season, but in (1029) no case is the water applied continuously. That method of irrigation could not be successfully applied in the Laramie River Basin for the reason that, as I have stated, the soil is very porous and there is no subsoil from which the plant might gather moisture, and in that type of irrigation it is necessary to keep the water on almost continuously [fol. 753] in order to have the water in contact with the plant (1030) roots. In my opinion 4250 acre feet of water at the point of diversion would be wholly insufficient to irrigate 4250 acres of meadow land, for the reason that more water would have to be diverted in order to keep a sufficient amount on the land to permit the consumptive use.

Cross-examination.

By Mr. James A. Greenwood:

I have been on the meadow lands in the Laramie River Valley three or four different times on trips through that valley. I know I was there in 1923 for several days. When I speak of a pound of dry matter I mean that in which the free water has been taken from the plant. The material is dried in an oven at about 110 degrees centigrade. The hay crop will generally vary in (1031) moisture from as low as 8% to as high as 20 or 25%. I am familiar with the practical method of irrigation and have practiced it in Colorado for a number of years. Crops have been irrigated under my direction for the past 24 years. We obtain our water for (1032) irrigation from a particular system which serves the land then being irrigated. The Cache la Poudre River supplies the water for the College lands located at Fort Collins, the Arkansas River supplies water for the College lands at Rocky Ford, and the La Plata River supplies the land which I supervise near Durango; the Culebra River supplies water for the lands which I supervise in the San Luis Valley and the Williams Fork and the Colorado River the lands in Middle Park, Colorado.

The methods of irrigation practised in Colorado are that the water is decreed to certain canals in which we own shares and a certain amount of water proportionately is delivered at any point under the canal for our use, and we are limited to a certain amount figured as a headgate diversion.

[fol. 754] Redirect examination.

(1033) By Mr. Shrader P. Howell:

There are some meadow lands located in the Poudre Valley in the upper elevations and the same method of irrigation is used on those meadow lands as is practised in the Laramie River Basin. Water is decreed in this State in second feet and it is decreed to carrying canals which are in most cases mutual companies owned by the landowners, and each owner in the ditch is entitled to his proportionate amount of the water in the ditch. The ditches are assigned priorities of a certain amount of water; when that water is not in the river the ditch is shut down.

[fol. 755] (1034) E. B. House, witness in behalf of defendant:

Direct examination.

By Mr. Shrader P. Howell:

My name is E. B. House and I reside in Fort Collins, Colorado, and I am the same E. B. House who testified in the original case of Wyoming vs. Colorado. I have resided in Fort Collins for 37 years and was born in Colorado 62 years ago and have had my home in this State during all of that time. My (1035) profession is that of Civil and Irrigation Engineer, and I am at the present time Professor of Civil and Irrigation Engineering at the State Agricultural College at Fort Collins. I received my public school and High school training at Greeley, Colorado, and I attended the University of Pittsburgh for one year and then went to the University of Michigan, where I graduated in 1896 with a degree of Bachelor of Science of Electric Engineering, and I pursued all of my elective work in the Civil Engineering Department at that university. In 1896 I was instructor in Mathematics and Physics at the State Agricultural College and was made Professor of Mathematics in 1897. I continued that work for 9 years and was then made associate Professor of Irrigation Engineering, which position I held for 5 years, when I was promoted to the position of Professor of Civil and Irrigation Engineering and head of the department, which posi- tion I have held for 23 years and I am now (1036) holding. I was born on a farm and my practical experience in irrigation began in my very early years. After I became associated with the college my summers were employed in irrigation work under Professor L. G. Carpenter then State Engineer for the State of Colorado, and that work consisted of the collection of data for the Kansas-Colorado irrigation suit which was then pending. I have since that time been acting as consulting engineer for various irrigation companies throughout the State of Colorado and [fol. 756] some in neighboring states. My work in that connection has covered stream flow, design and construction of structures for canals and operation.

I was born in Weld County, Colorado, and the State Agricultural College where I have been located for 37 years is

in Larimer County. Both of these counties depend on irrigation for the growing of crops. Both of these counties are included within Water District No. 3, covering the Cache la Poudre River and its tributaries. I am familiar with the conditions in the Laramie River Basin in Colorado, having made many trips through the valley hunting, fishing and sight-seeing. I do not recall having made any investigation along irrigation lines in that (1038) valley, but I have made many observations which have given me the knowledge I have of conditions. I have seen irrigation in progress in the valley and feel that I have a familiarity with respect to the conditions prevailing. The Laramie River Valley is a narrow mountain valley, very similar to the many other mountain valleys in Colorado. Along near the stream are the so-called mountain meadows. These are in no way similar to what are known as meadows in the Eastern section of the United States. There are rock outcrops and they are grown up with brush in places. There is erosion in places by side drainage coming from the steeper hills and cutting through the bottom land. The soil is a thin mountain loam, varying in depth from 4 inches to about a foot. This silt loam covers the surface of these meadows and immediately below is a layer of sand and gravel and below that would be bed rock. The valley of the Laramie has a fall of about 25 to 30 feet to the mile longitudinally and the side slopes toward the river would, I think, be approximately 150 (1039) feet to the mile. The valley throughout the irrigated section would average probably a half mile wide, and it would be probably 20 miles from the head of the valley to the State Line. Rather steep mountains are on either side and at the southern end of the valley there are also [fol. 757] steep mountains. The flow of the river is from the south to the north into the State of Wyoming, and there is no other direction for the stream to flow. The meadow lands are (1040) very close to the river bank. The soil is very loose and porous, which causes the water applied to the soil to drain back to the river very quickly. I know of no place where the water would be applied to those mountain meadows where it would not return to the stream within at least two miles. Any water applied returns very quickly to the river on account of the condition of the subsoil and (1041) of bed rock underneath. The approximate altitude of these meadows lands is about 8,000 to 8,500 feet. The

method of irrigation of the hay meadow in the Laramie River Valley is what we call "wild" flooding. Water is diverted from the river through ditches to the meadows; a branch will be run so that it will carry along the ridges to the high points in the meadows and there the water is allowed to trickle over the surface of the ground. Water is run continuously from the time it is turned on in the spring until shortly before the hay is cut, when it is turned off to permit the soil to dry sufficiently to cut and stack the hay. Water is turned on for irrigation about the middle of May and run until about the middle of July, giving an average irrigation season of about 60 to 70 days. The hay is harvested just as soon as the meadows dry sufficiently to sustain the weight (1042) of the harvesting machinery. The surface water that is turned on flows across the meadows, part of it sinking into the thin surface soil and then into the gravel layer, from there it returns to the (1043) stream. I think the so-called flooding method is the right and proper method for the irrigation of meadow lands in the Laramie River Basin. It has been used for many years and has proven itself as probably the best known method.

The method used to irrigate grain crops is what is known as the "field flooding" method. Small ditches are plowed at intervals across the field and the ditches are dammed and [fol. 758] the water flows over the bank. The water is turned from the main ditch into these field ditches and spreads across the land between the ditch that contains the water and the next lower field ditch. Whenever the (1044) ground is soaked sufficiently the dam is removed and placed farther down and the operation is repeated. For row crops, such as corn, potatoes and beets, the water is turned in at the high points of the field in a small ditch and it allowed to run down that ditch, passing between the rows of the crop and sinking into the soil, wetting the roots of the crop. When the water reaches the lower end of the row, it is turned out and the water set for the rows next beyond. The water is run intermittently in both these methods of irrigation as the soil in most cases is comparatively deep and is retentive, and a good irrigation will ordinarily suffice for from 2 to 3 weeks. Two, three and sometimes four irrigations are sufficient to mature the kind of

crops I have described. Such a method of irrigation as I have last described would not successfully irrigate (1045) native hay meadows, as the water would sink into the ground so rapidly that it would be impossible. The irrigation season in the grain and row crop country runs from about the first of May until about the first of September, and the method used to irrigate native hay as I have described it could not be successfully used in the raising of the grain and row crops because such a method would over irrigate those crops.

I have observed irrigation in the Big Laramie Basin in Wyoming, and the method I have described as being used to irrigate native hay applies to the lands in Wyoming as well as in Colorado. (1046) In my opinion 4250 acre feet of water applied to the surface of 4250 acres of meadow land in the Laramie River Valley in Colorado would be wholly insufficient to irrigate the crop of hay, because of the fact that the soil is so thin and non-retentive that an attempt to limit the water to that amount of land with the amount of [fol. 759] water specified would be impossible, as it drains away so rapidly there would be (1047) little or nothing left to feed the grass roots. No crop could be successfully irrigated by the diversion of a quantity equal alone to the consumptive use. Assuming 70 ditches in the meadow lands in the Laramie River Basin of Colorado and an irrigation season of approximately 60 days, there would be 1 acre foot of water for each acre at the point of diversion, so that in order to deliver that amount of water each of the ditches would be allowed approximately one-half second foot of water for the irrigation of that area of land, and that would be wholly an insufficient amount to divert for use. By consumptive use of water I mean the amount of water consumed by the plant and the amount of water evaporated from the soil or from the (1048) plant. The consumptive use of water varies with the crop and the evaporation of water is affected by the temperature and wind movements. In my opinion the consumptive use of water for irrigation on the (1049) meadow lands in the Laramie River Basin in Colorado amounts to .88 of an acre foot per acre per year, and I think that amount consumptively used will mature the average crop of hay raised in that locality.

(1050) Cross-examination.

By Mr. James A. Greenwood:

Evaporation fluctuates with the season of the year and the evaporation would be greater in July than in April or May.

(1051) Redirect examination.

By Mr. Shrader P. Howell:

In the irrigation of these meadow lands I do not think it is necessary or is a general practice to keep a free water surface over the meadows. The practice is to keep the roots continuously moist, and the meadows are not exactly flooded continuously, but they are kept continually wet.

[fol. 760] Recross-examination.

By Mr. James A. Greenwood:

The fundamental idea in all irrigation is to keep the (1052) roots of the plan properly nourished with water, and theoretically the best point is to have sufficient moisture in the soil at all times to supply the plant. Too much water would have a tendency to diminish the growth as well as to have too little moisture.

[fol. 761] ALVIN KEZER:

Direct examination.

(1053) By Mr. Lawrence Temple:

Referring to the method of distribution of water to users in various ditches about which I testified yesterday, I will take as an example the Arthur Irrigation Company, which is one of the ditches from which the Agricultural College gets its water, the ownership in that company is represented by shares of stock having a nominal par value, and the ditch owned by the company has a (1054) priority or decrees in the Courts of Colorado amounting to a total of 108.99 second feet. These priorities are of various dates and each is separately numbered. Each stockholder in the ditch com-

pany is entitled to his proportionate part of the water in the ditch at a given time, but no stockholder may demand any of the priorities awarded to the ditch from the river, his right being to demand his share of the water when it is in the ditch. The last date of the priorities of the Arthur Irrigation Company is No. 66 and is for (1055) 52.28 second feet of date September 1st, 1873. This last priority is in the river ordinarily until about July, and when that priority is out of the river, the users under the ditch must content themselves with the earlier priorities, and as the river drops these earlier priorities are taken from the ditch in their order.

Cross-examination.

By Mr. James A. Greenwood:

My understanding of the term priority as I have used it in my testimony is the right to use water under decree of the Court and that the ownership of the water remains in the State. The date of the priority as fixed by the Court decree gives the owner the right to a demand of the water from the river prior in point of time to the next succeeding appropriation. The owner of the priorities of which I have been speaking is the ditch company, and the stockholders and users have no demand on the river but only on the ditch [fol. 762] company for their share of the water then in the ditch. The water (1056) is distributed from the canal by a ditch river, who measures the water to the several users.

Redirect examination.

By Mr. Lawrence Temple:

When I speak of the "amount of his priority," I mean the user's share of the water in the ditch at a gvien time. The ditch rider is not an official of the State of Colorado, but is employed by the ditch company to distribute the water among the several users under a particular ditch.

(1057) Recross-examination.

By Mr. James A. Greenwood:

The Water Commissioner of the district distributes the water from the river into the canal in the order of priority,

and the ditch rider distributes from the canal to the various stockholders in accordance with their interests. The canal company sees to it that water is not wasted by the users.

[fol. 763] R. A. MOSIER, witness in behalf of defendant:

Direct examination.

By Mr. Shrader P. Howell:

I live in the Laramie River Valley, in Colorado, 16 miles above the Wyoming line. My Post Office address is Jelm, Wyoming. Have lived in that section from the (1058) spring of 1921. I came to Colorado in 1902. Until 1908 I resided at Denver. From that time I lived in Greeley and Ault and on a piece of land in The Greeley-Poudre Irrigation District, up to moving to the Laramie River Valley. My present residence is in the meadow section of the Laramie River basin in Colorado.

For twenty years I have been familiar with irrigation as practiced in Colorado, and since July, 1921, have been water commissioner in District 48.

My duty is the distribution of water in District 48. I also have charge of water recorders on the Laramie River (1059) at Jelm Station, at the state line, and at the Glendevy Station. The Jelm Station is under the direction of the United States Geological Survey. It is a fourth of a mile from the state line. I act as observer, change the charts, and report to the U. S. G. Office, 403 Post Office Building, (1060) Denver. The Glendevey Station is three miles from Old Glendevey on the Laramie River, in the State of Colorado. My duties there are the same, except the charts are mailed to the State Engineer's office.

My other experience in irrigation matters was that in December, 1914, I was elected a director of Greeley-Poudre Irrigation District, and re-elected and served until (1061) the spring of 1921, when I resigned.

[fol. 764] Since moving to the Laramie River Valley, I have operated a ranch in that valley 12 years. The Greeley-Poudre ditches extend from the high mountains in the Laramie River basin near Chambers lake and to the north, and out on to the plains in the Cache la Poudre basin northeast of Greeley, in the State of Colorado.

The altitude of the meadow lands in the Laramie River Basin in Colorado is about 7500 to 8500 feet. That valley is surrounded by very steep mountains on the east side and on the west side, and the meadow land itself is more or less sloping toward the river, which runs through them northerly into the State of Wyoming. The temperature is very cool, especially during the nights. The growing season is short. The meadow lands are contiguous to the stream, mostly come right up to the bank of the stream, a shoestring (1062) affect.

The Laramie River basin meadow land district in Colorado is about thirty miles long and a mile to two miles in extreme width. The meadows themselves are generally rough, more or less broken with little ravines, and depressions, which lead back to the main stream, and with clumps of willows. The width of the meadows themselves would probably be from one half to three quarters of a mile, but taking the valley as a whole the extreme would be two miles. (1063) The least width is a few rods to about three-quarters of a mile. They mostly lie adjacent to the stream. They are irregular in shape. They have a light sandy top soil, and coarse gravel subsoil. The soil is porous. There is a considerable slope toward the stream, so that the water returns very (1064) rapidly.

There are sixty-nine or seventy ditches in that valley, in my Water District 48.

[fol. 765] Irrigation season there commences ordinarily about the middle of May, when water is started on the meadows. The method of irrigating is f[illegible]ding the meadows and keeping the water continuously going until about the 15th to 20th of July. Then they usually shut the water off and dry up the meadows preparatory to cutting hay. It makes an irrigation (1065) season of sixty to seventy-five days.

Owing to the topography of the stream and meadow land irrigation, rocks and irregular formations of land, a great portion of that water never really reaches the meadow lands but returns to the stream, finding its way back into the stream by depressions of swales instead of down the ditch to the meadows, and so is not applied usefully or beneficially to the land but returns rapidly to the stream. That method of irrigation is necessary to successfully produce a native hay crop. This water should be kept continuously on the ground (1066) to make a hay crop.

In all probability the growth of the hay crop would be checked if the water were turned on and off intermittently and the grass might deaden and die. Ordinarily in mountainous meadows the ditches are poorly kept and often this water can find its way over the low places and into the swales and returns to the stream. That is due to the fact the meadows are rough. The water in these swales is not lost to the stream. The stream is depleted very little, on account of the rapidity with which the water is returned.

As water commissioner of District No. 48, I make (1067) an annual report to the State Engineer on Nov. 15th. That report covers the amount of water diverted into the various ditches, the acreage covered, the number of days each ditch is run, and their appropriations. My source of information in compiling this report as to the amount of acreage they [fol. 766] irrigate is (1068) ranchers and foremen.

As to whether it is based upon actual measurement, I know of no rancher that has ever had a measurement of his meadow land. It is based altogether on guesses or estimates. Upon that I based my reports to the State Engineer until 1931, when a survey was made of the valley in which the actual acreage was determined.

The amounts of diversions on which I have based my annual reports to the State Engineer have been ascertained largely through my estimates and by personal visits to the ditches. The number of visits varies, possibly one to ten in a season. I do not have telephone communications with the ranchers. There is no phone in that locality.

There are no measuring devices in the ditches. (1069) Practically speaking there are neither headgates nor measuring weirs. A headgate is for controlling water turned into the ditch or letting it out. A weir is for measuring water. In the Laramie River Valley of Colorado I think all headgates are of wood. They simply provide a means to let the water into the ditch or shut it out. Many of the ditches don't have a headgate. Ordinarily the water is controlled by turning it on in the spring, and the ranchers will dig out dirt and rock to make a temporary dam. Then, when they dry up the meadows for cutting hay, they place the temporary dam back of the mouth of the ditch.

(1070) I am familiar with the irrigation method prevailing in the Big Laramie in the State of Wyoming only through general observation. With respect to method of di-

verting and their headgates, or their absence, I believe conditions there are much the same.

[fol. 767] The ditches in my district 48 have never been rated to my knowledge. The State Engineer has not furnished me with a rating table for any one of them, nor given me authority to measure and rate them.

When I testified as to water not being beneficially applied to the lands, I meant that often the ditches taking out of the main stream at flood time have such condition that more water is taken into the ditch than the ditch will carry. That often results in a natural spillway and the water going back to the stream and not reaching the land, so that it is not (1071) beneficially applied to the meadow land. Water very rapidly returns to the stream by surface flow. These ditches, as a rule, in following the grade, do not get very far from the stream. That overflow occurs in flood periods, and acts as a sort of natural spillway. In more highly developed sections they usually build a concrete spillway, but in the mountains the low places act as a natural spillway, to return water to the stream. The distance from the stream is usually very close, from a few feet to 100 or 200 feet from the mouth of the ditch and it returns quickly to the stream.

The ditches having no headgates or measuring weirs or permanent method of diversion, the ranchers use dirt and rocks and possibly manure in some instances, to turn the water into the ditches, and in this mountainous isolated territory, the later and more modern inventions for handling water are not generally used. However, I believe the methods that are employed compare favorably with other territories of that particular nature, in other meadow lands in mountain sections of similar economic conditions. The devices, methods of irrigation and of maintenance of the ditches compare favorably. When I stated this morning the ditches were poorly kept, I had in mind that they are not usually kept in a high state of (1072) repair as in the [fol. 768] more highly developed sections. As to headgates, weirs, and all that, they are not practically in use or considered necessary. The ditches as they are maintained there meet the condition to irrigate the meadow (1073) land section. With respect to my former testimony to some water gathering in low places and returning to the stream, that ordinarily follows a rapid fall toward the stream by a current very perceptible.

My reports of annual diversions by these ditches as to annual amounts diverted are not generally speaking based upon actual measurements. They are largely estimates. The number of acres irrigated in the meadow lands, as reported, is usually obtained by inquiries of the ranchers and foremen. My reports are considered as mere estimates by the ranchers. Many have little conception of the actual acreage irrigated. They were my only means of information.

(1074) As to my annual report for the year 1931, excerpts of which have been read into the record by the complainant, purporting to show the number of acres of meadow land irrigated in 1931, in that year I was informed of the survey by Prof. Downing, of about 4,250 acres, through the State Engineer, Mr. Hinderlider. Mr. Downing and his party stopped there during the survey. My statement read from page 90 of the water commissioner's report for the year 1931: "According to the recent survey made of the lands of the Laramie River Valley, I am informed that the total amount of land irrigated in Water District 48 is 4,242 acres. This amount does not include lands irrigated on Sand Creek," was based on information given me by Mr. Hinderlider as to the result of the survey.

(1075) There had practically been no increase or greater acreage of meadow land irrigated in 1930 than in 1931. There was an exception of one small ditch known as the Grant Ditch. It has been referred to as the Mosier Ditch. [fol. 769] It was built to cover land the better portion of which was already under the Homestead Ditch. It would probably cover additional lands of 20 acres. That is the only new construction that I know of in the meadow lands during the time that I have been Water Commissioner in District No. 48.

(1076) Referring to matter from page 89 of my 1930 report, read into the record at page 514 of the original transcript, by the complainant, where appears "There is about 6517 acres irrigated," that was an estimate based on information gathered from the ranchers and would not be correct if the actual survey is correct. There was no additional acreage except this small ditch during 1930.

Referring to the extract from page 89 of my 1929 report, at page 511 of the transcript, as read into the record by the complainant, "The total number of acres irrigated in Dist-

trict 48 for this season 1929—8,436 acres," was based on an estimate from the ranchers. There was not an increased acreage irrigated in 1929 over 1931.

Referring to reading from page 89 of my 1928 report by complainant, as in the original transcript, page 508, "Total number of acres irrigated in District 48 for this season, 1928, 8,266 acres." That figure was obtained in the same way as my other reports. There has not been any increased acreage irrigation in 1928 over what was irrigated in 1931.

(1077) Referring to reading from page 89 of my 1927 report by complainant, as in the original transcript, page 505, "Total number of acres irrigated in Water District 48 was about 8,076 acres." Those figures were founded upon the estimate as I have described it. There had not been any increased acreage irrigated during 1927 over what was irrigated in 1931.

[fol. 770] Referring to my report for the year 1926, excerpts of which were read into the record by the complainant, page 503 of the transcript, page 89 of my report—"Total number of acres irrigated in Water District 48 was about 8,311 acres." Those figures were based upon estimates given by ranchers. There had not — any increased acreage in 1926 over what was irrigated in 1931, to my knowledge.

Referring to page 89 of my report for the year 1932, excerpts from which have have been read in the record by complainant, page 520 of the transcript—"Total number of acres irrigated in District 48 for the season 1932, about 7,000 acres. This estimate of meadow and pasture land of survey of 1931 shows 4,250 acres of meadow land which does not include lands on (1078) Sand Creek estimated at 505 acres." My figure of 7,000 acres was on information from farmers' estimates. The other statement was the actual survey by Prof. Downing. There was no increase of acres of meadow lands under irrigation in 1932 over that in 1931 at the time of survey.

My immediate superior officer in water administration is M. C. Hinderlider, State Engineer. Previous to that I was under direction of Mr. Cogswell, Division Engineer for Division No. 1. That position has been abolished and its duties taken over by the State Engineer.

(1079) I received my instruction concerning administration of trans-mountain diversions in Water District 48

from Mr. Cogswell. He instructed me not to take any measurements of the Water Supply & Storage water, or the Greeley-Poudre or Eaton systems, as this water was diverted into Water District No. 3 and there distributed, and accounted for by William McAnelly, Water Commissioner for District 3.

[fol. 771] The Water Supply & Storage Company ditch is known as the Skyline. The Greeley-Poudre is the tunnel diversion. The Eaton diversion is known as Sand Creek Pass and sometimes as the Worster Reservoir, which includes the collection ditches on Sand Creek in Colorado. That instruction from Mr. Cogswell was shortly after I started as commissioner, in July, 1921.

(1080) I have not visited the transmountain diversion to measure them. We have no telephone from any of them to my house, or closer than Old Glendevey, three miles away.

Direct examination.

By Mr. Kelly:

The Greeley-Poudre diversion is known as the Laramie-Poudre Tunnel project. The Laramie-Poudre Tunnel project consists of the tunnel and the collection ditches on the Laramie River. The water of the Greeley-Poudre project is picked up by collection ditches and conveyed through the tunnel. The lower collection ditch is known as the Lower Rawah or West Side Collection Ditch. The upper collection ditch is known as (1081) the Upper Rawah. The one on the east side of the river is known as the Deadman Ditch, and is sometimes called the East Side Collection Ditch. Of these ditches those in operation up to the present time are the lower collection ditch and the upper collection ditch. The Link Lakes constitute a part of the feeders for those ditches.

The tunnel itself does not gather any substantial amount of water. The West Side Collection Ditch runs water into the tunnel. Without the use of these collection ditches, it would be impossible for the tunnel as a practical matter to gather the amount of 15,500 acre feet.

(1082) The Upper Rawah Ditch is approximately 2,000 feet higher than the tunnel. It intercepts the same streams as the West Side Collection Ditch in a general way in some regions in the upper reaches.

[fol. 772] I don't think it would supply 15,500 acre feet to the tunnel. The amount of 15,500 acre feet has never been reached by the tunnel, to my knowledge. The Upper Rawah Ditch early in the season was rather limited on account of the high altitude and ordinarily covered with a foot up to ten feet of snow.

What is known as the Laramie-Poudre Tunnel project would be impossible to produce 15,500 acre feet without the West Side Collection Ditch.

As a director of the Greeley-Poudre Irrigation District Board from 1915 to 1921, I was quite familiar with the work known as the Laramie-Poudre Tunnel project. We had frequent (1083) meetings. We made frequent visits over the system. Prior to that I was a member of the Landowners' Committee, having to do with the prosecution of the enterprise part of the time. I was familiar in general from the time the former suit was brought by Wyoming against Colorado to enjoin diversion of water by the Laramie-Poudre Tunnel project up to 1921. The Board of Directors was continuously striving to raise money with which to prosecute the work and they did utilize the funds available by assessments and in various ways, for development.

(1084) We never gave up the effort of trying to go ahead and complete the system, so far as our funds would permit. During that time efforts were being made to complete the Laramie-Poudre Tunnel project. Work was being done there in 1915 and 1916. The purpose was never given up, of completing the system, diverting water from the Laramie River by means of collection ditches and carrying it through the tunnel into the Cache la Poudre River. There never was any talk of abandonment or not completing the work.

[fol. 773] As I understood the Laramie-Poudre Tunnel project, as a member of the Board, in those years from the inception of the Wyoming suit in 1911 to 1921, it consisted of the tunnel, tunnel reservoir, and the various collection ditches, the reservoir was simply a means of diverting water through the tunnel. The water of the Lower Rawah, or West Side Ditch, was gotten into the Poudre River through the Greeley-Poudre (1085) Tunnel. The Reservoir was a means of reaching the tunnel from the collection ditch. This ditch would empty into the reservoir above the dam and thereby the water got to the tunnel by being carried back over the reservoir. I know the present

completed West Side Collection Ditch, as it delivers water to the tunnel. It delivers water now into the Cache la Poudre River by about the same course of travel it would have followed across to the tunnel, excepting that now the water is carried over the land instead of over the water.

Virtually the same process of collection is used as was originally contemplated in the way the water gets through the tunnel, from Rawah. The line of ditch, other than this portion, which at the lower end runs into the tunnel, is virtually the same. That is about a half mile distance.

(1086) The obstacle that delayed completion of the Laramie-Poudre Tunnel project, during those years, was the pendency of this Wyoming-Colorado litigation, to enjoin the Greeley-Poudre from diverting a better part, or all the water, they were asking to divert through the tunnel. It was difficult at that time to interest any one in buying bonds or to help finance the system. The financing and the work done was not of the magnitude which had been carried on prior to the institution of this injunction suit in the former Wyoming-Colorado case. It was in a very limited way. I personally during the years from 1915 had to do with the work of putting in a temporary dam across the Laramie River at the mouth of the tunnel [fol. 774] and widening and deepening the intake, from the river to the mouth of the tunnel.

When I ceased to be a director of the District, the suit of Wyoming vs. Colorado had not yet been decided. After that suit was decided, the work toward completion was resumed on the project and the West Side Ditch has been prosecuted and eventually completed since that time.

(1087) Work was done on the distributing canals and reservoirs of the system in the Cache la Poudre Valley quite extensively.

About four miles above the tunnel, on the west branch of the Laramie River, the Skyline Ditch taps the headwaters of that river. The Skyline Ditch runs from the west fork of the Laramie River to the East fork of the Laramie River, along the mountain (1088) side. It collects all the water from the tributaries of the west branch, and of the tributaries of the east branch on the west side. The supply of water coming to the mouth of the tunnel below the Skyline Ditch without the use of the lower or west side collection ditch, and the upper Rawah Ditch,

would be very limited, would fall far short of the 15,500 acre feet.

During the irrigating season of 1926, the caretaker at the Laramie-Poudre Tunnel for the Laramie-Poudre Irrigation Company was Homer Duvall. He succeeded his father, Clem Duvall, who died in the summer of 1925. I think the company continued (1089) Homer Duvall during the following year. I do not know where Homer Duvall is now. I have not personally inquired about him. I understand a search has been made for him and that — is somewhere in Alaska—I do not know where.

I did not in the year 1926 make any measurement of the amount of water running through the Laramie-Poudre Tunnel or of the water collected and diverted through the collection ditches from the Laramie River.

In making my report to the State Engineer for the year [fol. 775] 1926 I put down the amount of water diverted through the Laramie-Poudre Tunnel system as 590,120,320 cubic feet. That is the report known as Exhibit 3, as introduced by the complainant.

(1090) In the absence of the caretaker, and Homer Duvall, I made an effort to get this information through the Secretary of the Greeley-Poudre, George F. Emith. That is the Laramie-Poudre Irrigation Company at the present time. I got a letter from George F. Smith, giving me that figure. The letter reads as follows:

"Greeley, Colorado, November 8, 1926.

Mr. R. A. Mosier, Jelm, Wyoming.

DEAR SIR:

Just received your inquiry of the 6th in regard to the amount of water run through the tunnel. The running of water was not in my hands and will not vouch for the records that I have but am sending you the computation of the water from the records sent to me by Duvall.

There are some skips in these reports and I do not know whether the tunnel was shut down at those times or not. This record also includes any water run by the Water Supply & Storage Company and as yet I have no way of segregating same from our water.

Duvall's report as follows:

(1091) March, 1926	3,542,400	cubic feet
April	49,446,720	" "
May	79,427,520	" "
June	115,215,760	" "
July	143,710,480	" "
August	165,720,800	" "
September	33,056,640	" "

total of 590,120,320 cubic feet.

If there is any particular importance to above, would suggest that you verify same from W. J. McAnelly as Duvall was supposed to make daily reports by phone to him.

[fol. 776] Duvall's address is as follows: J. H. Duvall, % Roy Fee, 315 So. Loomis St., Fort Collins, Colo.

Duvall's reports start in on the 5th of September and run to the 23rd of September. It is my understanding that this is the time that the water for the Water Supply was running and we were to get an average of 13 feet and the balance was to go the Water Supply. There are no reports for September until the 5th of the month and I presume we were shut out. Duvall quit on the 23rd of September.

Sorry that I cannot do more for you and if there is anything else that you want let me know.

Yours truly, G. F. Smith."

I was never able to find Duvall. I made the report (1092) without verifying it. I presume I did not receive this letter until the 10th or 12th of November. I lived in the Laramie Valley then. According to law, the Water Commissioner's reports are supposed to be in the Engineer's office by November 15th.

Referring to Exhibit 3, line 10, of the second sheet, being the lower half of the first photostatic sheet, which uses the figure 590,120,320 cubic feet for direct irrigation in District No. 3, through the Laramie Tunnel, my basis of making that entry was this letter from G. F. Smith. That was the only available figure for that report. The letter to which I have just referred is defendant's Exhibit S.

Cross-examination.

By Mr. James A. Greenwood:

(1093) I have been Water Commissioner for District No. 48 12 years, since 1921. I have lived in the Laramie River Valley during that time. I am acquainted, generally, with the valley and the ranchers living there. I have only knowl- [fol. 777] edge in a general way as to the extent of land embraced in the various ranches. I feel I am acquainted with the areas of the ranches. I know them in a general way. I do not know approximately how many acres of land are in them, because it is difficult to figure, or even estimate, with accuracy, these irregular pieces of meadow land. It is quite (1094) difficult to know the amount irrigated in this mountainous territory. I have been there 12 years. I don't profess to be an engineer. I have had this knowledge of the valley, but have not made a study of the acreages. I have relied chiefly on the ranchers to furnish that information. I presume they intend to make the amount fairly accurate. It is possible they exaggerate in some instances, for the reason their decrees probably call for a certain amount of water for a certain acreage, and they are inclined to use that as a basis of figuring the irrigated acreage. I do not exactly mean they would swell the actual number of acres, in order to induce me to let them have more water, but that they would base their acreage on what they claim could be irrigated or are irrigated.

(1095) The Laramie River is an interstate stream. I don't know whether from a legal standpoint my administration as water commissioner of District 48 on the Laramie River has been lawful.

My annual report is in the nature of a field book. I made such reports for the years 1926 to 1932. Those reports for those years contain information that was probably reliable to the extent of the source I had to gather from.

(1096) In view of the fact there has been a survey of the acreage of the land and the other being only estimates. I would say that during those years the reports were un- [fol. 778] reliable. And they were to some degree probably inaccurate. The 1931 report is an exception as to the amount of acreage reported; that would be reliable. I think I gave the surveyed acreage as 4,250 acres; I wouldn't be positive.

Q. I will read to you a statement taken from your 1931 report as follows and ask you to state whether it is reliable or unreliable. This is for the year 1931: "Total number of acres irrigated in District 48 for the season of 1931, about 7,710 acres. Total number of meadow land cut for hay in the season of 1931, approximately 6,491 acres." Now do you say that those figures are reliable or unreliable.

A. Those figures were obtained through the same sources, from the ranchers, as the other figures.

(1097) In making my 1931 report I did not rely on the 1931 Prof. Downing survey for those figures, nor for any purpose. That had been the usual method of getting this information during all these years I have been there. I think the Downing survey was given in 1931.

Q. I will call your attention, Mr. Mosier, to statement from your 1932 report, reading as follows, and I will ask you to state whether it is correct or incorrect: "Total number of acres irrigated in District No. 48 for the season of 1932, 7,000 acres." Reading further: "This is an estimate of the meadow and pasture land. The survey of 1931 shows 4,250 acres of meadow land. This does not include the Sand Creek land estimated at 505 acres." Now with reference to your figure 7,000 acres there, what do you say now about it as to its being accurate or inaccurate?

A. It would be inaccurate according to the survey.

(1098) I would say my report with reference to the number of acres of land irrigated and feet of water diverted from the Laramie River and used for irrigation, probably, could not be relied upon for accuracy.

[fol. 779] I put figures in my report for 1926, purporting to show diversion of water by the tunnel from the Laramie to the Poudre which information I obtained by way of a letter from an officer of the Greeley Poudre company.

My purpose for furnishing that information in my annual report, having been advised I was not to make any report on Laramie-Poudre diversion, was merely to make that showing of the amount of water supposed to be diverted for District 48. I don't think the officers of that company wanted to charge me with more water than they got.

As to the figure appearing on page 2 of complainant's Exhibit 3, showing that the amount of water diverted by the tunnel is 590,000,000 feet, I would say it was inaccurate, could not be relied upon.

(1099) There is information disclosing the amount of water taken through the tunnel in 1926. It is available from the secretary of the Greeley-Poudre. My own information came from the secretary of the Greeley-Poudre. According to this letter he did not attempt to segregate Water Supply & Storage water from that of Greeley-Poudre, nor did he verify the figures as given to him. I have no way of determining the amount belonging to the Greeley-Poudre or the Water Supply and Storage.

(1100) The East Side Collection Ditch has never conveyed any water to the tunnel. It has been two or three years or longer since any work was done on that ditch toward its completion. It has been quite a long time. No water has been diverted from that source. It is probably ten or fifteen years since the work was stopped. I was first a director of the Greeley-Poudre in 1915. From then I have had an intimate knowledge of the conditions of the valley with reference to any construction work done.

[fol. 780] (1101) I don't believe there has been any work done since 1915 on that ditch. I don't know just what year the West Side Collection Ditch first conveyed water from Rawah Creek to the mouth of the tunnel. It seems four or five years. I know when the Hamilton Construction Company moved in there to complete it, but I can't recall the year. I know the ditch has been built.

(1102) The ditch as now constructed conveys water at the lower end over land, whereas it had previously been designed to convey it over water through the reservoir. There had to be approximately a half or three quarters of a mile of additional ditch constructed, which would not have been necessary if the tunnel reservoir had been used.

I have not had experience in measuring stream flow. I am not a civil engineer. My duties are limited to administering the water rights in District 48, simply the distribution of water to the decrees as given by the Courts. If there was not sufficient water in the river to satisfy all decrees and Tom Jones had a priority of 1892 sufficient to take all the water, and his neighbor a priority of 1896 and

both were demanding water, I would recognize the earlier (1103) appropriator before the junior got any water. That is the law of appropriation. I would give the senior the amount of water his decree called for. That is my official administrative duty as to all ranchers with rights on the river, is to permit them to divert from the stream in accordance with the date of their priority. I know the owners of the lands in the Laramie River Valley in Colorado. The Greeley-Poudre Irrigation Company owns much land in the valley. I could (1104) not give a reasonable estimate of acreage of meadow lands it has. I don't believe it is a substantial acreage. They own three or four ranches having meadows in the irrigated section.

[fol. 781] G. F. SMITH, witness in behalf of defendant:

Direct examination.

By Mr. William R. Kelly:

I reside at Greeley, Colorado. I am Secretary of The Laramie-Poudre Irrigation Company, Secretary of the Greeley-Poudre Irrigation District, Secretary of The Greeley-Bondholders' Committee.

I have been connected witht the Greeley-Poudre project in the capacity of one who has observed its development. I first purchased land in 1908 in what was afterward The Greeley-Poudre Irrigation District. I have been familiar with the development of that project from that time forth.

From the beginning of it up to the present I was a land owner at all times; I was in the real estate business for 12 years, and during two periods of that time my office was in the same room with the Greeley-Poudre District office, and at (1105) another time was in an adjacent room.

I served on their boards of election; have been auditor of their books at various times; have been employed by them at various times. I have been secretary of The Greeley-Poudre District since 1922.

The period I officed with the District was when I was partner with J. R. Moore and we had our office on 9th Street, in Greeley, and for about six months in the same room with The Greeley-Poudre District. That was in

early 1910. From 1912 to 1915 our rooms were adjoining. There were several occasions when I was auditor of the District beginning about 1912.

I have the records of The Laramie-Poudre Irrigation Company, of The Greeley-Poudre Irrigation District, of The Poudre Valley Reservoir Company, and I have such portions of records of The Laramie-Poudre Reservoirs and Irrigation Company as have not been lost.

[fol. 782] The Poudre Valley Reservoir Company was an (1106) incorporation and when the contract was made with the District in 1909 they were to have a controlling interest in the Poudre-Valley Reservoir Company.

The Laramie-Poudre Reservoirs & Irrigation Company is a contracting company that was to sell the System when completed. It merged into that company about 1907 and entered into a contract with The Greeley-Poudre Irrigation District in 1909 to turn over their properties and to do certain completion work for a sum of money and bonds.

They did not carry out their contract, and about 1912 deeded the system to The Greeley-Poudre Irrigation District.

The Poudre Valley Reservoir Company was a separate corporation in which The Greeley-Poudre Irrigation District was to have had substantially 55 per cent of the ownership. It had a separate bond issue and there was a foreclosure of that bond issue about 1916-1917.

In 1925 these various interests were all merged in The (1107) Laramie-Poudre Irrigation Company. Control of all these corporate entities was merged in The Laramie Poudre Reservoir and Irrigation Company prior to 1912; that is, prior to 1912, these companies which had been constructing the system contracted to deliver their works and sell them, completed, to The Greeley-Poudre Irrigation District. That District was a public corporation. In 1912 that company deeded the works to the district.

The occurrence between 1909 and 1912 affecting ability to build the enterprise under The Laramie-Poudre Reservoirs & Irrigation Company was that the Wyoming v. Colorado suit was started in 1911. It was to enjoin the diversion of any water from the Laramie River by means of the Laramie River tunnel project with its collection ditches.

[fol. 783] The effect this had was that they could not sell their bonds. The ability of the farmers themselves in the

condition (1108) of their affairs then was such that it was beyond their resources to complete the works without selling bonds. The particular nature of the resources of the farmers at that time was that much of that land was raw, prairie land, with the exception of people there as homesteaders, and they had very limited means. Their lands were bonded for the construction which had already been done. Up to 1912 there was about three million dollars in bonds issued by the district for this construction work.

After 1912 the work slowed down. The district voted maintenance taxes every year, and they spent every dollar they could get hold of, but the resources were very limited. They were not able to carry on the work with the magnitude of extent of construction which had been carried on up to 1912. That period of suspense continued up until it was merged with The Laramie-Poudre Irrigation Company, which was subsequent to 1922.

What happened in the fall of 1922 to define the enterprise was the decision of the Supreme Court of the United States. (1109) That settled the amount of water the enterprise was permitted to divert, fixed it at 15,500.

The intended purpose had been to divert by the Laramie Tunnel project something like 70,000 acre feet. In the meantime the project was under a cloud, seeking to enjoin it from diverting any water whatever.

Work on the system was carried on during the period from 1912 to 1923. In a general way it was scattered over the entire system. The land owners raised by assessment and spent from the years 1922 to 1924 approximately $252,000 in construction, in holding the enterprise intact and doing such development work as they were able to do. Some of that was done on the plains of the Cache la Poudre and distributing canals, (1110) some on storage reservoirs, some on the Laramie River. They were not able to make [fol. 784] any large expenditures on the Laramie River during that period.

After the decision in the Wyoming vs. Colorado suit of 1922, in a general way, in resumption and completion of the enterprise, by a number of public meetings and contributions by the Chamber of Commerce of Greeley, of Fort Collins, and of Eaton, certain ones in Nunn and Pierce, and various landowners, there was formed the Greeley-Poudre Adjusting Committee, of which I was Secretary.

They, in turn, formed The Laramie-Poudre Irrigation Company. It was incorporated in August, 1923. Through their negotiations they arranged with the lienors against the old District; that is, the parties holding the bonds which were on the system and those holding mechanic's liens, to exchange their liens for stock in the new company, and at the same time, in 1925, the District deeded its system of ditches and reservoirs and appropriations of water to The Laramie-Poudre Irrigation Company for a majority interest in the stock of that company.

(1111) The Greeley-Poudre District got 7,025 shares; the lien claimants got about 1,150 shares, the holders of underlying bonds about 1,995 shares. Shortly after that the company gave The Great Northern Water Supply Company 2,000 shares of stock for the old Poudre Valley system, subject to a bond issue of $400,000. In the interim from 1912 to 1932 there was a foreclosure, about 1916 or 1917, on the old Poudre Valley Reservoir Company, and there were foreclosures of many mechanic's liens and underlying bonds pressing, in the District Court of Larimer County, Colorado, and in other courts.

In the reorganization it was necessary, first, to clear up the internal affairs of the enterprise by bringing (1112) these liens to a conclusion. In that conclusion they were [fol. 785] brought into decrees which eventually were transferred to the corporate entity known as The Laramie-Poudre Irrigation Company in exchange for stock. It is a mutual, not-for-profit company. Its stock is used for irrigation of land and represents the pro rata share of the appropriation and works of the system. The company is the trustee for the stockholders as appropriators. The enterprise known as the Greeley-Poudre system, since 1925, has been carried on under the corporate entity of the mutual ditch company instead of the District. There is combined into that system everything we could find which was in it back in 1913.

What is known as the Laramie-Poudre Tunnel system is (1113) that part of the enterprise incorporated into the Laramie-Poudre Irrigation Company. The Laramie-Poudre Tunnel consists of the tunnel, diversion works, and feeder ditches. The purpose of it is to collect water to bring it over to serve the lands and distribute it. The system was projected for 125,000 acres. Canals were built to cover a system of approximately that size. There have been dis-

tributing canals built to serve about 40,000 acres, which was originally in the project. The Laramie-Poudre Tunnel project is now the same as it was in 1911 to 1914. The tunnel does not collect water of itself. (1114) It diverts the water from the Laramie River. The water is collected from the Laramie River itself in part. The major portion is from the collection ditches.

The system has never been able to divert 15,500 acre feet. It was never able to divert 15,500 acre feet prior to completion of West Side Collection Ditch. The largest diversion I can recall was in the year 1932 and since completion of the West Side Collection Ditch. The West Side Collection Ditch is an essential part of the Laramie-Poudre project. Without it the project could no divert 15,500 acre feet.

[fol. 786] Since 1923, in warrants, second mortgages and stock issue, we spent approximately $342,000 on the Laramie-Poudre project. Approximately $126,000 of it was spent on the completion of the West Side Collection Ditch.

Aside from the obstacle of the pendency of this (1115) suit to enjoin diversion of water from the Laramie River, there intervened to delay the completion of the project, the World War, prices were high, and it was looked upon as unpatriotic to engage in such a large enterprise.

Since then intervened the general agricultural depression, resulting in Federal Farm Relief Acts and such things. There has never been a relinquishment of the purpose to complete the Laramie-Poudre Tunnel project so as to divert the permitted amount of water. That work has been carried on, in view of the obstacles encountered, with all the diligence the resources of the farmers and those appropriating water would permit.

(1116) Among men leading the development up to 1914 on the District Board were Burt Shaffer, Ed Latham, Billy Edison, and Attorneys Delph Carpenter and C. F. Tew. On the construction end were D. A. Camfield, S. H. Shields, W. S. Biff, James R. Thorpe and Wellington Hibbard, and Watson Zigler. Mr. Tew has died. Mr. Camfield and Wellington Hibbard are deceased. Senator Carpenter has very poor health, is not able to travel, or to speak with facility, is confined (1117) to his home. Others previously in the enterprise have died.

Clem Duvall was the caretaker of the Laramie-Poudre Tunnel in 1925 and for some years previous. He died in 1925. His son, J. H. Duvall, finished out that year, to De-

cember 10, 1925. His employment ceased then. It began again in March, 1926. He was not employed by the Laramie-Poudre Irrigation Company between December 10, 1925, and the middle of March, 1926, nor did he represent [fol. 787] it, to my knowledge, as an agent (1118) or employee. He was employed in 1926, from March to September 23rd. The company has tried to locate him by inquiries, but has not been able to do so, to my knowledge.

The attendant at the tunnel now for the irrigation company is S. L. King. This is his third season. Fred Foster preceded him in 1930, from March 14, to May 31, and A. M. Deer from June 1, to August 31. In 1929 W. A. Luce was (1119) there, from April 15 to September 20.

In 1928 Irving Turner served as observer or tunnel attendant, starting March 1, continuing until September. He was working there in 1927, also, from April until September 30.

Mr. Parker was president of The Laramie-Poudre Irrigation Company from the time it was incorporated in 1923 until the time of his death early in 1930. During that time he was the presiding officer who administered the water collection (1120) and distribution. Under him Frank O'Brien was superintendent.

In the fall of 1926 The Laramie-Poudre Irrigation Company in an emergency loaned the use of its tunnel to The Water Supply and Storage Company, to carry water in the latter part of the year. That was an arrangement for that year only. A memorandum in writing was drawn for it, reading as follows:

"August 23, 1926.

The Water Supply and Storage Company, Fort Collins, Colorado

GENTLEMEN:

Our company has decided to accede to your request for accommodation to temporarily run water through our Laramie-Poudre Tunnel in your present emergency on your Skyline Ditch, this ensuing month. The water to be run, we understand, will be the amount available at your Skyline Ditch headgate on the river, less such possible appropriated differences in deficiency of diversion at our West Portal headgate on the Laramie, less such deduction for loss in carriage from our Skyline (1121) headgate into

the Poudre, as the Water Commissioner, Mr. W. J. Mc-
[fol. 788] Anelly shall determine. Our company shall receive as compensation for the carriage $7.50 per million cubic feet taken into our Tunnel, and we shall be saved harmless from any damage incurred by anyone which results from the increased flow in our tunnel, or its connections with the Poudre. It is understood that this arrangement is only temporary and is not to give rise to any claim that you have made our Tunnel a common carrier thereby, nor is it to give rise to any right, title or interest in the Tunnel, or to be the basis of the initiation or prosecution or perfection of any appropriation by you, or a precedent for any similar future action or arrangement. The whole idea is that as quickly as you have made the repairs presently to be made, you are to return to the use of your ditch, and this company's rights in the Tunnel and all its incidental rights of way and appropriation shall be exactly as before, our desire being to extend an extraordinary accommodation to your water users in view of the critical situation, and this arrangement shall not by any means last beyond 1926.

The action of your Board approving this arrangement and signified hereon by your President will cause it to go into effect.

The Laramie-Poudre Irrigation Company, by H. D. Parker, President. Approved and accepted. Water Supply and Storage Company, by A. C. Kluver, President,"

and seal of the Water Supply and Storage Company.

This is a part of the minutes of The Laramie-Poudre
(1122) Irrigation Company.

[fol. 789] (Stipulated reading of document shall take place of offering writing itself.)

I didn't have anything to do with making or keeping a record of the water brought through the tunnel. Duvall communicated that to Mr. Parker. I found the record of the report after Mr. Parker died. I had seen it before. I found it within the last two weeks. The company had moved its office. I had made diligent search for this record repeatedly for the past three years, at the insistent request of Mr. Kelly. One day, looking for something else, in the files of the old Poudre Valley Reservoir Company, I found

the reports of Homer Duvall. That report had not been in the hands of attorneys for the (1123) State of Colorado, or the District, until the past week.

I wrote this letter of November 8, 1926, to R. A. Mosier, defendant's Exhibit S. The information given in that letter is not correct. I based that letter on computations Duvall had made on the back of his reports. I have since actually computed what is a correct addition of the acre feet of discharge. I find there are two duplicate sheets in there. I have not attempted to ascertain how he arrived at his figures.

Mr. Kelly offers defendant's Exhibit T, consisting of 29 sheets, each entitled "The Greeley-Poudre Irrigation District—Engineering Department—Laramie-Poudre Tunnel Rating Station—James H. Duvall, Observer," beginning with (1124) March 24, 1926, and ending with September 22, 1926.

That is a report of James H. Duvall of the reading of the meter at the tunnel for the year 1926, in his handwriting. I found it recently, among the files of the old Poudre Valley Reservoir Company. Prior to that I got it out of the office of Mr. Parker after his death, among his files. He had a number of bill files there in which he kept his ditch records. After his death they called me to take them.

[fol. 790] I have computed the total discharges shown for the season by those weekly reports. The total is 309,311,360 cubic feet. It would be about 7,100 acre feet. That shows (1125) the total amount run through the tunnel in 1926, of which I have any knowledge. It includes water run through the tunnel for the Water Supply & Storage Company, while the tunnel was loaned to that company. They paid about $190, at $7.50 a million for it. That would make 26 or 27 million feet of water that company brought through.

The Greeley-Poudre Irrigation District lands have not been brought under irrigation up to 40,009 acres. There has not been obtained a sufficient annual supply to have irrigated the acreage to which the distribution canals have been built. (1126) This 15,500 acre feet is absolutely required and necessary for irrigation of these lands. In my opinion it cannot be obtained without use of the collection ditches, tunnel project, and particularly the West Side Collection Ditch.

Cross-examination.

By Mr. James A. Greenwood:

I wrote the letter to Mr. Mosier, dated November 8, 1926, defendant's exhibit S. I took the information from Duvall's reports where he had computed it on the back of the reports, but I qualified my letter. I do not vouch for the accuracy of the reports. I would say now it is not accurate. He was employed by my company. I wouldn't say his reports were not accurate. I would say the computation on the back of his reports was not accurate. I do not doubt the accuracy of the (1127) report on the front sheet. I do not know whether they are accurate except as they are read on the face. These computations are inaccurate.

We did not run that amount of water through the tunnel in 1926. It couldn't. I was not there. I do not know personally about the figures on the face of these reports, ex- [fol. 791] cept that Duvall made them. All I know is that he was employed by us; that he made these reports to Parker and I found them in Parker's office. I presume them to be substantially correct. I based my statement that only 7,100 acre feet were diverted in 1926 on these reports. I have not rechecked them. My results are based on them.

I do not know that the Colorado state officials were furnished with a copy of the letter or agreement of (1128) August 23, 1926, read by me into the record, or that they knew anything about this arrangement. There was such an arrangement for two years. I do not know whether there was a third.

I know I was opposed to it. I did not like the idea, because I thought we would get the water anyway, and what was the use of giving it to the Water Supply. Their ditch was above the diversion point of the tunnel, and if limited to 18,000 acre feet per year, we would catch the balance.

If our diversion works are below the Skyline and the tunnel is in working operation and has the capacity we could take all the water that came down below the Skyline diver- (1129) sion.

We never did get close to 15,000 acre feet by the tunnel. From my knowledge of the amount of water that went through the tunnel in 1926, the official record, the annual report in the State Engineer's office of 13,760 acre feet was

inaccurate and not a true statement of the amount of water diverted.

I think we have Clem Duvall's records there for 1925. I do not know that they are made public to any one to inspect. They are the records of the Laramie-Poudre Irri-[fol. 792] gation Company.

For the year 1926, in answer to the question that the division engineer's records disclose 5,640 acre feet for the Skyline, and the Water Commissioner's records show 13,760, and my statement that it is 7,100 acre feet, I think the Water (1130) Commissioner's records start about May 4. The computations I have made start in March. Any one consulting these records would have difficulty to tell how much water went through the tunnel in 1926. He would have to take the record that he had in which he placed the most reliance. Ordinarily that would be a public record.

I presume the records in the office of the State Engineer, with reference to the annual transmountain diversions from the Laramie to the Poudre are public records, and that the division engineer's records filed in that office are public records.

(1131) The record from which I determine 7,100 acre feet is presumed to be the same as sent in by McAnelly of District No. 3. I have not rechecked them and do not know what it shows. I did not know anything about this record until very recently.

Redirect examination.

By Mr. William R. Kelly:

That record, Exhibit T, is the only record I have been able to find showing daily average diversions through the tunnel as reported by James H. Duvall to H. D. Parker. Errors I have found were that there are two duplications and two skips, one of about four days, and one of about five days.

I have not attempted to reconcile Duvall's computations on the back of those sheets. I do not know how he arrived at those figures. I would say in explanation that I was probably negligent in writing that letter to Mr. Mosier at that time without rechecking the figures. Right then I was [fol. 793] avoiding all the work I could, because my wife had died two or three weeks prior to that time and I was (1132)

indisposed. I do know I gave Mr. Mosier that information based on error in computation. I do not have anything to do with the automatic register charts which are kept at the tunnel. I presume they are sent to the Water Commissioner I do not know. If they are sent to him, I presume anyone inquiring could find them.

S. L. King, witness in behalf of defendant:

Direct examination.

By Mr. William R. Kelly:

I reside at Greeley, age 43; present occupation, observer at the weir at the east portal of Laramie-Poudre (1133) Tunnel. I was employed in the same position in the years 1931 and 1932; that is, from about May until September. My business is to look after the measuring of the water of the tunnel discharged into the Cache la Poudre River and to report it each day to Water Commissioner W. J. McAnelly for District No. 3, Colorado. It started May 3, 1933, May 12, 1932, and ended October 11, 1932. It started (1134) May 26, 1931, and stopped August 27.

A gauge is at the side of the weir there. It has a sheet showing the different hours and the amount going through the Venturi flume. The gauge is on the right hand side as you look down the flume. It is a clock form, has dials showing the hours and the days of the week. A pen is set at the (1135) hour when you change sheets. There is a staff gauge alongside the registering device in the weir. The height of the water is usually set on the sheet of the dial by Mr. McAnelly, when he comes up and starts the water. About the only change I have to make is that sometimes it will run an hour fast in the week. Once in a while the clock will stop and you have to set it. I check the reading every [fol. 794] once in a while to see that the clock is running with the staff gauge mark.

These register charts or dials are mailed in at the end of each week to Mr. McAnelly, together with the report for that week. When I went there, my arrangement was to make that report and to mail this sheet to him weekly. I did so.

That duty or authority arises only by reason of being observer while under employment of The Laramie-Poudre Irrigation Company. He usually comes and starts it on a certain date, (1136) May 2 or 3 this year (1933). I continue sending him the charts until they stop the water. I send a report to him with this slip every Sunday night and one to Mr. O'Brien, the Superintendent, for the Laramie Poudre, at Greeley. Other than the weekly report to Mr. McAnelly, I telephone him every night the reading average for the day.

There is fluctuation during the hours of the day this early. It will vary some as to high point and low point. This early, owing to the weather, it starts up about 9 o'clock and continues up until about 6 or 7 of an evening, when it goes down. That hour is later in the evening, as the summer comes on and it gets warm. It is progressive later. In my daily (1137) reports to give the average height, I cover the hours from 4 P. M. one day to 4 P. M. the next day and take the average and report it to Mr. McAnelly.

Cross-examination.

By Mr. James A. Greenwood:

I am employed by The Laramie-Poudre Irrigation Company, not by the State of Colorado. My work is because of my employment by the company. My duties are reading the meter. I have been (1138) engaged in that duty three seasons. I had not had similar duties prior to 1931 for any other company, but was inexperienced then. My only experience is from May, 1931. I went to work May 3, 1933. The chart was started when I got there. That was the first chart record.

[fol. 795] I phone Mr. McAnelly each evening the average reading from 4 to 4. By adding the twenty-four hours and dividing by 25, that gives the pass over the weir as recorded. I (1139) stay there in the fall until they stop the recording of the water. Mr. McAnelly visits the east portal of the tunnel ordinarily two or three times during the season. He relies largely upon my reports and the automatic register charts I send him.

Redirect examination.

By Mr. William R. Kelly:

I could not get up earlier this year because there was talk of putting a meter on the other side. The roads were impassable the latter part of April and the first of May. I got there as soon as I could on account of the bridge there at the creek. They just finished it that afternoon and I went over it that night.

(1140) By taking the heights from 4 P. M. to 4 P. M., I get the average and compute the discharge in second feet. I give Mr. McAnelly the average gauge height.

It is my habit to clean out any debris that comes through there if it comes down the front of the weir. I have never seen the tunnel when there was any debris on the crest. It is impossible to collect right in front of the crest of the weir.

As to trouble with people bothering the measuring device there, hinges have been taken off a time or two, but there has never been anything broken. I think the clock was stopped a time or two last summer, but I am not positive. It is supposed to be locked to keep meddlers from interfering. There are a lot of youngsters go up Sundays. It should be (1141) kept locked.

The east portal of the tunnel is a farily prominent location, right on Highway 14, the way across the Rocky Moun- [fol. 796] tains over Cameron Pass. The house is down on that road at the foot of the tunnel where quite a few go by. The dike of the tunnel, the fill where the water is taken out, is plainly visible from this highway.

Recross-examination.

By Mr. James A. Greenwood:

I am in exclusive charge and am caretaker for the outlet of the tunnel, except when Mr. McAnelly makes his visits. Both the State of Colorado and The Greeley-Poudre Tunnel depend on me. If I have this device locked they should get my consent for opening it. I would like to know if any one is entitled to inspect it before I permit them. If I thought people had no (1142) interest or right, I would not let them inspect it. However, I have never refused anybody yet to look in there that wanted to.

It is my understanding there was some talk of changing the weir to the other side. I did not get that direct from any one of the Laramie-Poudre people. Mr. Stimson told me they were talking about changing the weir to the west portal. They (1143) did not say why they were talking about making that change.

[fol. 797] (1144) Irving Turner, witness in behalf of defendant:

Direct examination.

By Mr. William R. Kelly:

I live at 407 Jefferson St., Fort Collins, Colorado; age 52; was connected with operation of Laramie-Poudre Tunnel (1145) from April 1 to October 1, 1927. Again in 1928 I was connected — it, lived at the east portal on the Cache la Poudre Riverside. The house sets on the right hand side of the road known as the Cameron Pass Highway. The distance up to the east portal of the tunnel is ⅛ to a fourth of a mile. The works of the east portal are visible from the road. It is 1,000 feet above, is a big excavation, a quite noticeable thing. I was there when there was installed the improved Venturi weir, by the Department of Agriculture, Mr. Ralph Parshall of the State Agricultural College.
(1146) I was caretaker there, observer of the amount of water flowing through from the Laramie River

In that weir is installed a staff gauge at the side of it and an automatic register, a device which has a float which rests on the top of the water level, that operates a dial, that runs like a clock. The float goes up and down on the river in the well. It is opposite the high point on the bottom of the Venturi weir. In the years 1927 and 1928 this clock registering device was maintained on that side of the Venturi flume next to the mountain, the left hand side as you look (1147) down stream.

In reporting the amount of water run through I took the measurement from the recorder at 4 o'clock in the afternoon and phoned Mr. McAnelly about 7 o'clock at night. I took it from 4 to 4, including 4 o'clock each time. That made 25 hours. I figured it and phoned in the average gauge

height. I also sent him the dial register sheet from the automatic register.

[fol. 798] I have seen Mr. Drummond at this measuring device. I never prevented him from making measurements, never refused him the key—don't believe he ever asked for it. I had quite a little trouble in operation of the weir with people who had no business looking. The locks were tampered with.

(1148) When I went there April 1, 1927, there was no water coming through from the Laramie River. I went to the Laramie River about April 3. Its condition as to water coming through at the headgate was such that I chopped the ice away from the gate and shoveled the ditch from the gate to the tunnel and moved a sack dam outside the gate, in the Laramie River. That prevented water coming through from the Laramie River. There was water collected by the tunnel on its course at that time. The tunnel seeps all the time. There is always water in there. In some (1149) places it is up to your knees. There is not a large amount of water.

I have spent winters in that vicinity, stayed all winter, 1927, until my work began as an employed in 1928, lived at tunnel house, east portal. I observed the fluctuation of the streams there during the hours of the day. The fluctuation of streams at that altitude and locality depends on the weather. If it is warm, there is more water coming than when it is cold. It thaws up there some days in the winter. The high point of flow up there in the month of February is ordinarily between 3 and 4 o'clock in the day.

(1150) Very little, if any, rock or debris lodged along that Venturi weir opposite where the registering device had its float. Very little lodged during any substantial flow of water on the crest of that weir at the place where the measurement was taken. The weir was narrower in its central portion where the water drops out. That is what we call the throat. I think some rock or debris lodged in the throat. If there was not so much (1151) water running through, I went in and took it out. If there was much water I put a plank across and got it out.

[fol. 799] It was my habit to take out rock or debris that I found in there. Sometimes I would not have to clean it

for three or four days and sometimes I would clean it out twice a day.

Cross-examination.

By Mr. James A. Greenwood:

I was caretaker two seasons, 1927 and 1928. I made my reports to Mr. McAnelly. I had no prior experience with getting the flow of water through ditches and streams, or in gauging stream flows, or any knowledge of the operation (1152) and manner in which water in a weir functions. Before that I had worked at most anything, but in connection with that kind of work.

I cleaned the throat of the weir or the flume twice a day. There would be quite a lot of rock or debris in that I would have to get out at different times. If I didn't clean it out, it would pile up. I took my orders from Mr. Parker and Mr. O'Brien. I was employed by the Laramie-Poudre Irrigation Company. I was not a state official nor paid by the State of Colorado.

(1153) Mr. Hinderlider came up there the two seasons I was there perhaps two, three or four times. Mr. McAnelly came up sometimes, probably, three or four times a season. Aside from the visits of McAnelly and Hinderlider, it was all left in my care. No one else was there.

The automatic register house where the recording device was installed and operated was kept locked. I had the key. It was there when I went there. I don't know whether it belonged to the state or the Irrigation Company. It was at the house when I went there. I suppose it belongs to the company (1154) and not the state. I was working for the Laramie-Poudre Irrigation Company. I made reports every night to Mr. McAnelly of the reading of the water.

[fol. 800] I determined the water flow for a 24 hour period, from 4 P. M. to 4 P. M. by taking the feet and tenths and added them up, and had a chart to go by, and phoned in to Mr. McAnelly. I relied on what the automatic chart showed. I phoned the information to him for what it had recorded the previous 24 hours. I have not independent knowledge of my own of how to measure water, in the absence of using this automatic register.

Redirect examination.

By Mr. William R. Kelly:

(1155) I call the structure which runs from the mouth of the tunnel out to the Venturi weir, the weir. That was made of cement. The Venturi weir is made of wood. The rock and debris never lodged in the throat of this wooden structure called the Venturi weir.

Recross-examination.

By Mr. James A. Greenwood:

It lodged back of the Venturi weir before it came into the throat.

Redirect examination.

By Mr. William R. Kelly:

I was reading the weir under the supervision of Mr. McAnelly. I had authority from him while I was under employment to observe that register device.

Recross-examination.

By Mr. James A. Greenwood:

(1156) In addition to making the report to Mr. McAnelly I also made reports to The Greeley-Poudre Irrigation Company weekly. I do not know how much water passed through the tunnel while I was there in 1927. I never kept track of it. I suppose it was kept track of by Mr. Parker in Greeley and by Mr. McAnelly from the information I gave them.

[fol. 801] They were not up there often enough to keep track of it themselves from personal inspection. I suppose they (1157) relied upon my figures. I was not hired by Mr. McAnelly. My instructions, from Mr. Parker, when I went there, in 1927, was to make my reports to Mr. McAnelly and also *the* the company. Mr. Parker was president of the company. The same situation prevailed in 1928 while I was there.

I stayed there all winter in 1927. My employment ceased about October 1, when the water was shut off. After that I did go up to the tunnel and did observe what was going

on after I was off the pay roll and before I went on again. (1158) I did not find water going through. There might be a little seep through. There was not any to amount to anything in October. I went on the payroll in 1928 in March. The water was not flowing in March. I was working in the tunnel. It was flowing after I started it, about the 10th of April. I made my first register report for the year 1928 in April, I believe it was the first week in April, about the 10th. If there was enough water to measure, I made a report the first night the water was started. That would be about 9 feet when I set my first chart.

(1159) I started the clock or apparatus on the registering chart then— not Mr. McAnelly. He came up after I had started it. I started the clock in 1927 alone. McAnelly was not with me, nor was Mr. Hinderlider. I just got my instructions to go up, and moved in and started the clock.

Recross-examination.

By Mr. William R. Kelly:

Mr. McAnelly inspected the registering device at different times and gave instructions how to manage it and how to set it. I followed his directions.

[fol. 802] Frank O'Brien, witness in behalf of defendant:

(1160) Direct examination.

By Mr. Wm. R. Kelly:

I reside at La Porte, Colo., near the mouth of the Poudre Canon, in Larimer County; am Superintendent of The Laramie-Poudre Irrigation Company; have been Superintendent (1161) since 1925. Before that I was connected with the project under the name The Great Northern Water Supply Company. I have been familiar with The Greeley-Poudre or Laramie-Poudre system for thirty years; have been connected with it continuously since 1900. Since 1925 when the present corporation took charge, I have had the superintendence of diversion and distributing works and storage works of that system.

(1162) Before 1925, from 1919 on, I was Superintendent in charge of the distributing of the water that came into the system out of the Cache la Poudre River.

The Laramie Poudre system, in a general way, consists of the tunnel and collection ditches, the valley distribution ditches, and reservoirs. The Laramie-Poudre tunnel project consists of the tunnel and collection ditches. Its object is to bring water from the Laramie watershed to the Poudre. Water is taken out of the Laramie watershed by collection ditches through the Laramie-Poudre tunnel—the Upper and Lower Rawah—the west branch of the Laramie River and the East Side Collection Ditch, the latter not completed.

The Upper Rawah Ditch is at a pretty high altitude west of the tunnel. The Lower Rawah Ditch is lower down (1163) and delivers water directly into the tunnel.

There was a plan which obtained for a time for the Lower Rawah Ditch to discharge into the tunnel reservoir at a dam about 1400 feet down the river to the tunnel. That reservoir has not been finished.

[fol. 803] The Collection Ditch does not make any difference in the amount of water collected by the present means of conducting it to the tunnel compared to what it would if the tunnel reservoir were used to bring the water across. The completion work on it was begun in 1920 and finished in 1930. It was preceded by engineering and plan of financing in 1928. The first water in this lower Rawah Ditch was run out of Laramie River tributaries in 1929, before it was (1164) completed. It was first conducted through the tunnel in 1930. It has been completed as far as Rawah Creek.

It is built on the same level of the right of way of 1913. I was not very well acquainted with it in 1913. When I first went up there the West Side Ditch was partially completed and the right of way was all cut. It does not divert water from any different place so far as you could tell than what was the cleared right of way in 1928. At that time there were two tunnels completed which anybody who walked along there could not very well get around. The ditch uses these same tunnels. Prior to the completion work in 1929 there was a dam across the Laramie River proper. The Laramie Tunnel Project was not able to get a dependable suppyl, 15,500 acre feet, without the Lower West Side Collection (1165) Ditch. It was collecting the headwaters of

some of the streams intercepted prior to that. The Upper Rawah Ditch collected water from the streams high up. In the average year you could not get 15,500 acre feet at all without completion of the West Side Collection Ditch, because there wasn't the supply. The upper ditch as to producing water in the season is high up and hard to get water through early in the season, due to snow and ice. The lower ditch produces water a great deal earlier than the upper ditch. It is easy to get the water in the spring from the lower ditch.

[fol. 804] So long as I have known the system it is my un- (1166) derstanding the collection ditch system, particularly the West Side Collection Ditch, was intended to be completed as soon as possible. From 1911 to 1922 it was delayed by panic, hard times, politics and the suit of Wyoming to enjoin diversion of that water which stopped the work because we didn't have any money to work with.

The Greeley-Poudre system project could not be a success without completion of the Laramie-Poudre tunnel collection system. They would not have sufficient water. If that suit had resulted in preventing water being taken from the Laramie River, the works on that river could not (1167) be financed and built.

In a general way after that suit was determined work done toward completing the system was $110,000, may be, by the Great Northern people on the system and on the reservoir, exclusive of work done by The Greeley-Poudre Irrigation District. The Great Northern Company was the company which held the title to what is known as the Poudre Valley part of the system after its foreclosure until it was put back in the system in 1925. That $110,000 was spent by that company on the distributing (1168) canals and reservoirs prior to 1925. After 1925 there was work done on the system by other than the Laramie-Poudre Irrigation Company itself. The farmers did a great deal of work on the ditch and reservoir down in the Pierce District and built the Owl Creek Lateral and Central Lateral. The farmers kind of built those laterals and took them over themselves, one four miles long and another seven or eight, and the Central Lateral of the length I do not know. As to continuity of effort and purpose to complete the Laramie-Poudre tunnel project, consisting of the collection ditches, or bringing over 15,500 acre feet for irrigation out of the Laramie River,

[fol. 805] I would say that from 1919 I have been on the job continuously with the exception of two months, and I did work every month in the year since 1919 to the present time. (1169) Since 1925 when I went with the Laramie-Poudre Company there has been continuity of effort to get these ditches built. As a whole it has never been abandoned. It was intended to complete it to the amount of 15,500 acre feet for irrigation. It was intended to observe the limit of 15,500 acre feet.

I am familiar with the weir in the east portal of the tunnel. It was put in in 1927. I don't make regular trips but am up there two or three times a week, sometimes once a week, sometimes once in two weeks depending upon the time of the year. That has been my habit since 1925.

(1170) As to whether that weir clogs with debris or gravel, I have never seen any obstruction at all in the weir proper. By "weir proper" I mean the Venturi flume. That is about 6 feet wide, and with about 12 foot wings. That is what I call the weir, 12 feet back from the crest. It has a dip in it. It is about 8 feet on the outer floor. 6 feet is the width of the narrowest part, commonly called the throat. I don't think that weir will collect debris, gravel or rock on the crest of it. I have never noticed anything on the crest of the weir. The reason it does not collect rock or gravel is that it is designed not to collect anything like that. It is narrowed up; that speeds the water, and there is a dip that will carry anything over the crest, except something like a log. I have never seen it when there was debris or (1171) rock on the crest.

The crest is not the place where the automatic register float is set. The float is set back of the crest. That is where you determine the water over the crest.

[fol. 806] My instruction to the man up there is to keep it cleaned out, if they see any obstruction there to clean it. I have never had any occasion to clean out the weir because there was nothing lodged in there. I am up there frequently. That is ordinarily the main source of our water supply. I have not been up there lately but have been over on the west portal a good deal since April 4. I was over there Tuesday of the past week. I have to get over there now by going by Laramie City and up the Laramie River to the west portal. That makes a distance of 120 miles. I was there (1172) June 10, 1932.

I have been there and seen Mr. Drummond, an official of the State of Wyoming there measuring at the weir at different times, I can't say as to the dates. I have had the experience of finding rock collected up stream from the Venturi weir. I observed the effect of cleaning out that rock as to whether it changed the gauge height recorded. I didn't make any difference at all. I was there when four or five men, one day in 1932, cleaned that flume back of the weir of all the rock and sand. We had a fairly good head of water, 100 feet possibly. We cleaned it all out. Mr. Drummond was there that day.

By "back of the weir" I mean up stream. There is an angle in that flume above the Venturi weir. That tends to throw the gravel to the left side of the flume and the (1173) water to the right side. Mr. Parshall and I experimented a little with the effect of the gravel as tending to make the measuring device register on the left side looking down stream show more water coming through than was actually passing through. We put the well on the left side of the Venturi flume. Then we changed it to the right hand side. Mr. Parshall checked that water with the meter against the Venturi flume and it proved all right.

[fol. 807] This automatic register is now located on the right hand side of the Venturi weir as you look down the stream. In 1927 it was on the left hand side. We built a concrete wall on the right hand side and moved the register further away from the Venturi flume, in order to get a steadier flow.

(1174) Assuming there was actual debris collected over a foot or so of that portion of the crest of that weir so that the water was not passing over that side, and the registering device was on the left hand side, the effect would be to tend to register more water as flowing through than was actually going through. In calculating 15,500 acre feet, it would not be to the detriment of the State of Wyoming, it would be beneficial to them.

I first became acquainted with Mr. Drummond and knew he was taking measurements up there in 1927. I did not refuse him the right or authority to measure at the east portal of the tunnel. I asked him what his business was there and if he had any authority and he said he had and gave me a letter from the State of Wyoming. I said "that

is all right". I did not want to have him go up there and not know who he was.

I have made inquiries trying to find J. H. Duvall who was at the east portal of the tunnel in the summer of 1926 and have not been able to locate him.

(1175) I was at the tunnel in the fall of 1926 and did some work. I left a steel gate at the west portal or diversion and a sand bag dam 2 feet high on the river. That stopped any amount of water from coming through. Some seeped through but no flow. The tunnel collects along its course about a second foot.

[fol. 808] In 1926 I worked with Mr. Parker in handling the tunnel. He was president of the Company. For reports as to water that went through the tunnel I depended upon the caretaker there; also kept in touch with Mr. McAnelly all the time.

I was at the west portal of the tunnel about Easter day, April 16, 1933. Our work was there was shoveling snow (1176) and we did a lot of work on the tunnel in the fore part of April—cleaning up. I estimate we ran two or three second feet of water. The purpose of that was that we had shoveled a channel from the tunnel back to the river and the snow was 6 or 7 feet deep. We did that to slush out the snow and to take out the rock. I was also at the east portal of the tunnel about that time. There was then some water flowing down Tunnel Creek, probably 5 or 6 feet. The tunnel itself discharges into Tunnel Creek at the east portal. That water in Tunnel Creek was not running through the tunnel, except a little seep which always comes through.

(1177) In the spring Tunnel Creek sometimes carries a good deal of water. At that time we had dug the channel to slush the west portal in order to get the snow out of the way to enable us to do any work. We trenched this snow about 3 feet wide down to the bottom of the ditch and then ran water to rot the snow. A small head of water always comes. We cannot handle a big head of water.

I have had experience up there in the cold winter months on the Laramie and Poudre Rivers. There is more water in the daytime there in winter than at night, generally speaking, but warm nights and cold the next day, there would be more water at night than in the middle of the day. In the middle of February I would say the high water flow

in the Laramie River and the Poudre River at that altitude would be in the afternoon, about 3 to 5 o'clock.

[fol. 809] (1178) The object of that weir at the east portal of the tunnel is to keep itself clean at the place where the level of the water is registered in the measuring device. It cleans itself. If there was not enough on the crest, it would never come on through. With a large head of water I don't think anything stops on the crest, unless there is a jam like a log.

Cross-examination.

By Mr. James A. Greenwood:

I never checked the weir myself in the channel where the gauge height staff is set, with reference to the deposits of rock and debris in the channel just above the throat of the flume made a difference in the height of the water when there was a small head. I have had Mr. Parshall check it and Mr. McAnelly checked it when I was with them at different times. There was a small head of water at those times. The only check I made was with a heavy head of water, 100 feet. With 100 feet of water or a head of that kind, water will rush right along anything that is in there and will naturally keep that flume at more or less of an even depth, level on top.

(1179) The number of times I visit the east portal of the Tunnel each year depends on conditions, how many times I am required to be there, something wrong. I make regular visits in the water season over on the west side ditches, in fact I am there part of the time every summer, and I go by the east portal of the tunnel in going up there. I never go by there without stopping.

I work for The Laramie-Poudre Irrigation Company, have no connection with any state official; all my operations there are for my employer.

(1180) The system of the Laramie-Poudre Irrigation Company stores water sometimes during the winter months, but they don't store all the time. They generally start about the 1st of May or middle of April.

[fol. 810] Whatever water is diverted from the Laramie River we use for direct irrigation. It does not escape. I know something about the Skyline, but not how much water comes through that ditch into Chambers Lake. I live 8 miles northwest of Fort Collins. My duties as superintendent of

The Laramie-Poudre Irrigation Company are that I look after the work, reservoirs, ditches and tunnel.

(1181) I have not anything to do with recording of the stream flow in any of the streams that deliver water to the system. I know something about it. I am not an official. I know where the west branch and where the east branch of the Laramie River are located with reference to the place where the Skyline ditch has its headgate on the Laramie River and with reference to where the water is diverted through the Laramie Poudre tunnel. Prior to the time the West Side Collection Ditch was so constructed as to deliver water to the tunnel, the tunnel obtained its water from the west branch of the Laramie and Upper Rawah Ditch and the east branch of the Laramie from the slopes toward the Laramie and from the upper Rawah and tributaries of the west branch. Prior to (1182) completion of the West Side Collection Ditch in 1930, no water was delivered through the Lower Rawah Ditch, except that in 1929 we did run some water through the lower end of the ditch through the Laramie River from tributaries on the lower end of the Lower Rawah Ditch. It was a small amount of water. We just soaked the ditch up. It wasn't measured in the ditch at the west portal.

(1183) If the crest of the weir at the east portal was obstructed, it would record more water according to the automatic register and give the water more height than was actually going through. It would be more or less inaccurate if [fol. 811] the crest was obstructed at all.

I was not acquainted with the right of way of the West Side Collection Ditch in 1913. I say it is built on the old right of way from what I observed in going over the old right of way in 1927 and 1928. The West Side Collection crosses the floor of the Laramie Valley an awful short ways before it comes to the Laramie River—a quarter of a mile. (1184) It skirts the mountain side above the point where the original reservoir dam was going to be constructed about a half mile. I have seen maps of the original location. I don't know whether they were the original maps or not. I did not have those in mind when I stated the ditch was constructed on the original right of way as laid out in 1910 and 1911. I drew that from the fact I had been up to that ditch at different times in 1927 and 1928 and the right of way was clear—the timber all cut and piled back up to the Rawah.

(1185) The right of way was not then cleared from the point opposite where the dam site was located to the tunnel reservoir. We cleared that after 1925 for about three quarters of a mile from directly west of the dam site. That is new from there down. In some places there was no clearing to it, but on the upper end of the ditch was pretty heavy timber and the right of way was cut. There were sections of the ditch partially constructed. I can't tell what work was done on the ditch prior to 1927, the first time I was over that right of way.

(1186) The purpose of the Greeley-Poudre project, including the East Side and West Side Collection Ditches, tunnel, reservoir, etc., has not been abandoned, as a whole, because as long as I have had any connection with the system, we have always done some work on some part of the system continuously, and it was my information that it was the original plan of the company to construct the East Side [fol. 812] Collection Ditch to carry water to the tunnel. I don't know what the intention is as to whether the East Side Collection Ditch has been abandoned or continued. I suppose that depends on circumstances. I do not know what the present intention of the company may be with reference to the future development of this project on the Laramie River side of the mountain. It would be up to the directors and officials of the company. I was just stating my opinion when I said the work had not been abandoned.

(1187) Redirect examination.

By Mr. William R. Kelly:

1927 was the first time I was over the right of way of the West Side Collection Ditch. I had been there prior to that at the west side of the portal doing work over there, and in charge of trying to get water from the Laramie River (1188) tributaries and the Laramie-Poudre tunnel and collection ditches. I know there was a plan at that time to complete the ditches.

I was there frequently during 1925 and 1926 at the west portal of the tunnel and diversion works across the east and west branches of the Laramie River, not very frequently in 1925. There was then a way across the floor of the east branch of the west branch of the Laramie to divert water into the two branches themselves. The method now

used for getting water to the tunnel does not make any difference in the result from what it would be if the water flowed across the river instead of in an open channel. It is a matter of running around the reservoir site.

There were two interruptions in running the water through the tunnel in June and July, 1926. We had a cave-in right at the west portion of the tunnel which closed the tunnel 4 or 5 days or a week. I did some concrete work there (1189) in the fall of 1926.

[fol. 813] The water brought from the Laramie River is used for direct irrigation. We depend, for the amount we are able to divert out of the Poudre, upon the reports we get from the water commissioner as to the amount we have put into the Poudre. A deduction charge of 5 per cent is made for carriage, that is the customary charge for carrying water in the Poudre from that point.

The Skyline headgate is upstream from the tunnel diversion works out of the Laramie River. The Skyline intercepts streams above its headgate and along the course of its ditch and the watersheds above. It is about 3 miles along the stream up to the Skyline headgate from the Laramie Poudre tunnel diversion works on the Laramie. There is not any substantial amount of water flowing between Skyline headgate and the tunnel diversion.

(1190) It is not enough to make up 15,500 acre feet.

The Venturi flume automatic registering device does not register the velocity of the water. It presumes the water is flowing and not standing still. If there was no motion to the water going over that weir it would not fit the table by which they calculate the number of cubic feet per second. There would not be any water. If there were debris and sand in the crest of the weir, water could go across the top of the sand. It would reduce the cubic feet per second of water going across, as compared with what apparently would be registered. If there were debris and sand across the crest of the weir the registering device would show more height and show more water passing then was going over the weir.

[fol. 814] Recross-examination.

By Mr. James A. Greenwood:

(1191) I do not know whether the Laramie-Poudre has ever objected to the Skyline ditch taking more than 18000

acre feet in a season with reference to the supply of water from the east and west branches of the Laramie River. Whatever water comes into the river above the tunnel would be captured before the tunnel.

[fol. 815] (1191) BURGIS G. COY, witness in behalf of defendant:

Direct examination.

By Mr. Wm. R. Kelly:

I live in Fort Collins, was born and raised there, have been away a few years at a time. I am a civil engineer, have been engaged in that profession since 1904. I graduated from The Rensselaer Polytechnic Institute in 1904. I have specialized mostly in irrigation and tunnel work. (1192) From June, 1904, until September, 1905, I was connected with the United States Engineer's office in Memphis, Tennessee, and Vicksburg, Mississippi. The summer of 1904 I spent mostly on the levee location and construction, and river banks location and construction of that, under the direction of the United States Engineer's office at Memphis. In the fall I came back into the office where I worked for two or three months. In February, 1905, the office was divided, and part of it went to Vicksburg. I went with that division and stayed down there that winter and summer. We worked practically the same as in Memphis, on different sections of the river, and also did some work on Red River. We also made quite a number of surveys to determine the navigation channel, and whether the banks (1193) were cutting, and so forth.

I also prepared most of the data for the annual report for the Memphis office for 1905.

In September, 1906, I went to New York City as Assistant Engineer for the Rapid Transit Construction Company. This company had a contract to build the extensions of the New York City subway over to Brooklyn. This went under North River and extended down the streets of Brooklyn to the Long Island Railroad station. I was assigned to the third division of this improvement, part of which was in Brooklyn, beginning at the edge of the river and extending over to the Long Island Station.

[fol. 816] There my work consisted in general supervision of subcontractors and the collection of data and cross-data and progress reports, and general office work.

In September, 1906, I came back to Colorado and was engineer for the Mitchell Lakes Reservoir Company, which was a company operating or building some reservoirs on the head of the North and South Pine Creeks, which are tributaries of the Cache la Poudre River. That fall and winter I laid out and constructed dams on what is called the Dowdy Lakes and Twin Lakes—dams and outlets—and also made surveys of these two reservoirs, and submitted filings for the State Engineer's office. In May, 1907, the Mitchell Lakes Reservoir Company was consolidated with The Laramie Reservoir and Irrigation Company, I think it was called at that time. They formed the Laramie-Poudre Reservoir and Irrigation Company, and I went with this consolidated company.

During the season of 1907, which extended from about the middle of June until the latter part of October, I was up on the Link Ditch, Link Lakes. I laid out and cross-sectioned and superintended the construction of the Link Ditch, and also surveyed several of the lakes at intervals as we had time. That ditch is what is known as the Upper Rawah Ditch.

We stayed up there that summer as long as we could work, until the snow drove us out, and I came back to the valley. Through the winter of 1907 and 1908 I was employed in the Prairie division of the Laramie-Poudre Reservoir and Irrigation Company, locating a main canal from the end of the old Poudre Valley Ditch, extending it out to the new McGrew Reservoir. Also construction work was going on on this same ditch, on the parts already located.

In 1908 I went back to the Laramie River, early in the spring of 1908, and spent a month or two surveying the [fol. 817] Vick Stewart Reservoir site, known as the Laramie River Reservoir. The rest of the summer of 1908 and the winter and summer of 1909 I spent in surveys for the Laramie-Poudre Reservoir and Irrigation Company on various parts of the project. This included the work on the main canal, and on that we ran two or three different locations over toward (1194) the Central Lateral and McGrew outlet, and the Pierce Lateral, and also ran one

line to the end of the main canal above McGrew, and over Crow Creek, to see where that would go.

Among the reservoirs of this project that I surveyed or worked on were the McGrew Reservoir, March, Camfield, Greeley-Poudre No. 2, Cobb Lake, Douglas, Douglas No. 2, Coal Creek, Holick, County Line and five and six of the North Poudre system. We made quite a number of other preliminary surveys to prove they were not feasible or desirable.

(1195) In the fall of 1909 I went back to the river and located the Laramie-Poudre Tunnel, and the East and West Side Collection Ditches, and the Laramie River Reservoir. The construction work on this project started that fall, and was cross-sectioned enough to get the contractor started. This work of location and cross-sectioning of the ditches and the reservoir, the dam and outlet, was continued the next year and finished in 1910. In the mountains the construction work was proceeding on the tunnel, and on both the East and West Side Collection Ditches, and on the Laramie River Reservoir.

The summer of 1910 and all of 1911 was spent in this construction work on the tunnel and various projects on the Laramie River. The last work we did there was to construct the approach cut to the tunnel to bring the Laramie River water to the tunnel. The actual tunnel part was completed in August of 1911.

[fol. 818] I was engaged in the office in Fort Collins for The Laramie-Poudre Reservoir and Irrigation Company until June, 1912, doing general office work. From June, 1912, until July of 1923, with the exception of the two years in which I was in the army, I had an office in Fort Collins doing general engineering practice and consulting work, and while so engaged, I did all kinds of land surveys, and surveys for irrigation reservoirs, ditches, highways, bridges, and general practice. Included in that was quite a lot of work for The Great Northern Water Company, construction and surveying. That included Timberline Reservoir and Twin Lakes (1196) Reservoir, which are on the headwaters of the Little South Fork of the Poudre, and on Cobb Lake, and Douglas Lake.

I was also Engineer for the Mountain and Plains Irrigation Company, which was a Fort Collins Company, building reservoirs in the mountains and in the Valley, and

ditches. I think they have now eight reservoirs with considerable mileage of ditch. Nearly all the reservoirs were built under my supervision. I also made surveys of various other sites, and reports on them, some of which proved to be impracticable, and some of which will, probably, be built later on. At one time or another I did work for nearly all the irrigation projects in the Valley here.

In May, 1917, I enlisted in the army, and was assigned to the Officers' Training Camp at Fort Riley, Kansas. In June I was transferred to the Engineering Training Camp at Fort Leavenworth, Kansas. I received a commission of Captain of Engineers in July, 1917, and in August was assigned to command Company D of the 314th Engineers at Camp Funston, Kansas. In the spring of 1918 I went overseas with this Engineering Regiment, together with the 89th Division, of which we were a part, and was in active serv- [fol. 819] ice in France from about the first of July until the armistice was signed in November. We took part in two major offenses, the San Mihiel drive and the Argonne Forest drive. I worked there as engineer with the regiment and assisted in building the trenches and dugouts, putting up barbed wire entanglements, roads, road construction, traffic police, and various kinds of buildings. After the armistice was signed we were assigned to the Army of Occupation and spent the winter and the next spring in Germany, mostly at road construction and buildings, (1197) together with the general routine of army work. In March, 1919, I was made Major of Engineers and assigned to the First Battalion of the 314th Engineers. We came home in June, 1919, and I was discharged at Fort Russell, Wyoming, in July, as a Major of Engineers.

From July, 1923, to March, 1927, I was employed by the Moffat Tunnel Commission as Resident Engineer at the East Portal of the Moffat Tunnel. This is a railroad tunnel about 50 miles west of Denver on the line of the Denver & Salt Lake Railroad. It is about 6.1 miles long, 24 feet high, 15 feet wide, and there is a parallel tunnel, which we call the water tunnel, 8 x 8, the same length. As Resident Engineer, I had charge of the legal surveying and laying out of the lines and grades, and also the construction work, which was done by a contractor on a cost plus basis, so we had a great deal to say about the way he did the work.

After the headings met in the spring of 1927, I went to California, and from April, 1927, to December, 1927, I was with the Southern California Edison Company, of Los Angeles, as Superintendent of their Big Creek Hydroelectric development—had charge of the construction of the concrete dam 85 feet high, steel pipe line 7 feet in diameter, and a mile long, and 3000 feet of tunnel. This was during the working season of 1927 which went from April to December.

[fol. 820] From January, 1928, until July, 1928, I was back at Fort Collins carrying on general engineering practice, and I also did quite a lot of work for The Mountain and Plains Company again. From July, 1928, to February, 1930, I was in Honolulu, Territory of Hawaii, as Superintendent for (1198) E. J. Lord and Company, who had the contract to build a tunnel about 20,000 feet long through and under the streets of Honolulu, for the purpose of a large intercepting sewer. This tunnel was completed in January, 1930, when I returned to Fort Collins again.

Included in this tunnel we had 38 shafts which varied from 20 to 100 feet deep to connect the existing sewers with this intercepting sewer. That tunnel was lined with concrete throughout, and the material through which it went was quite varied. In other words, it was from loose beach sand, volcanic ash, lava, clay, and some fairly hard basalt rock.

In February I arrived back at Fort Collins, and from February, 1930, to May, 1932, I continued in general engineering practice there, and also built a reservoir for The Mountain and Plains Irrigation Company on their system. From May, 1932, to date I have been City Engineer of Fort Collins, and am Assistant Commissioner of Works. Under this department I have charge of the construction and operation of the streets, alleys, waterworks, sewer plan, sewer system, street car, cemetery, parks, and so forth.

In 1911 I was elected an Associate Member of the American Society of Civil Engineers, and in 1918 I was made a full member. In 1912, I wrote a paper on the Laramie-Poudre Tunnel, which was submitted to the American Society of Civil Engineers. It was published in Volume 75, page 724. That was in 1912. In 1913 this paper was awarded the Thomas Fitch Rowland prize as the best paper in its class submitted during the year 1912.

[fol. 821] From 1904 to the present time I have been familiar with irrigation construction and development work in the (1199) Cache la Poudre Valley.

I was on the Greeley-Poudre project, the Laramie-Poudre project, from 1907 to 1912. Actual construction was going on during that period. I made a location survey for the Laramie Poudre Tunnel, substantially on the line of previous filings. I think they were cross-sectioning the tunnel in 1909 and began actual tunneling on New Years Day, 1910, and from then on the work was prosecuted day and night.

The Laramie-Poudre Tunnel project consisted of the collection ditches from the Laramie River, the lakes and the (1200) tunnel, Tunnel Reservoir, and distributing system from the plains.

The function of the collection ditches was to collect the water to bring to the tunnel, by diversion to the Poudre River. The tunnel of itself did not collect any great amount of water. The Tunnel Reservoir was put in to regulate, primarily, the flow of the ditches, and secondary, for storage.

I was familiar with it from the inception of the project up to 1909. I think the Tunnel Reservoir was conceived in about 1907.

In 1911, on account of the filing of the Wyoming-Colorado suit, the projectors were unable to sell the bonds and secure enough money to keep the work going. The last work I did on the Laramie River, I think, was in December, 1911. I was working on that cut to go from the Laramie River over to the base where the tunnel started. I think it was about (1201) 1500 feet.

The tunnel could not be made an effective diversion works for 15,500 acre feet of water without the collection [fol. 822] ditches. I have been over the line of the West Side Collection Ditch as it has been completed. I think in the project in 1911 we had three tunnels projected in the ditch line to some points, and they went around those points in open ditches to the tunnel. East and west it was the same way.

The building of the Tunnel Reservoir had just started. The outlet was put in and some work was done on it. As now diverted from the Rawah and the intervening tributaries of the Laramie River down to the tunnel, the method of construction of the ditch does not divert any more water

on the Laramie River watershed than would have been diverted had the Tunnel Reservoir been completed. The water would get to the tunnel by means of the tunnel reservoir by discharge from the collection ditches, and going out on the east side by the tunnel. Original construction work was suspended on the West Side Collection Ditch in the fall of 1910, I believe.

(1202) The works on the Laramie River project, as it was being completed at that time, were such that any one traveling up and down the valley would see them. At that time that place of construction was not accessible as at present. Since 1911 a good road has been built from Chambers Lake out to State Highway 14, down to the Laramie River, and goes past the west portal of the tunnel. I think that was finished within the last five or six years. At the time we were building the tunnel there was no road down there except a trail cut down through the wood, and every time you went along you had to cut the trees out. As the means of access you had to go around to Laramie City, and in the summer time over Deadman Hill. In the winter time there was no access. The Forest Service built this road which makes the shortcut to Chambers Lake down to the west portal of the tunnel.

In 1911 there were no power shovels. The work was all

(1203) hand work and with teams.

[fol. 823] During 1909 and 1910 portions of the East Side and West Side Ditches were constructed, to get water to the tunnel from the east and west branches of the Laramie. The lower end of the West Side Ditch as actually completed forms a method of diversion into the tunnel, cutting into the Laramie Valley.

Having in mind the pendency of the suit of Wyoming against Colorado from 1911 until late in 1922, and the intervention of the war, and the agricultural depression which prevailed, I would say that due diligence has been employed in the prosecution and completion of that project for diversion of water from the Laramie River by means of the tunnel and collection ditches.

Cross-examination.

By Mr. James A. Greenwood:

I do not know whether there was any work done on the west side between the fall of 1910 and the spring of 1911.

I don't think there was any work done on that particular project, to amount to anything, in completing the ditch. I was speaking of the project generally when I answered Mr. Kelly's question that in my judgment the construction work had been prosecuted with due diligence. As to whether the present means of carrying the Rawah Creek water through the tunned has necessitated the construction of approximately three-quarters of a mile, or more, of ditch than what would have been necessary under the original plan to deliver that water up to the Tunnel Reservoir, when I went up there the ditch was staked out clear around the hillside to the tunnel. That was the plan about 1907, to carry the Rawah water by an independent ditch to the tunnel. That plan was abandoned and changed to the reservoir. As finally constructed, the ditch now does operate as an independent entity carrying the Rawah water to the Laramie River (1204) perhaps two or three hundred feet above the tunnel diversion works.

[fol. 824] (1205) The tunnel got the main ditch water from the Laramie to the Poudre prior to West Side Collection Ditch completion from the east and west forks of the Laramie and from the Upper Rawah Ditch and from many tributaries between the diversion point and the Laramie. I don't think there are any living streams there. The only source of water that the tunnel has been able to gather from the time of its completion in 1911 until it was able to receive Rawah Creek water was that collected from the east and west branches of the Laramie and with the aid of the Upper Rawah Ditch. I don't know when the first water was turned through from the river. The actual tunnel itself was completed in 1911 about the first of August. They went to work about the 1st of September, 1911, on the cut and worked until cold weather came on. That is the 1500 foot cut from the tunnel to the mouth of the river.

Redirect examination.

By Mr. William R. Kelly:

(1206) When I stated the tunnel was completed I meant the bore. The concrete lining was put in some time afterward. There was no means of getting water into it.

When I answered that the Rawah Ditch as now built is an independent entity, I did not mean that is a separate

thing from the tunnel project. It is part of the tunnel project. The Lower Rawah and the Upper Rawah Ditch and the East Side Collection Ditch are all a part of the tunnel project and they are all interdependent, a combination for the diversion of water from the Laramie River. The tunnel carries the water after it is collected by the ditches.
(1207) That work had to stop at the end of 1911 until after the litigation is completed. Other litigation in the way of lien foreclosures arose as the result of this after 1911. There were a multitude of liens of contractors and [fol. 825] engineers and people who worked who filed liens for the amounts due. They continued until after the conclusion of the suit of Wyoming against Colorado. Then they were turned into shares of the mutual irrigation corporation now operating the system. That corporation is now operating the same system which was existing in 1911 practically.

The Rawah Ditch did not then constitute an independent entity. It was always part of the tunnel system.

Under the original plans water went directly to the tunnel.
(1208) It was expected to divert by this system, prior to the Wyoming injunction proceedings, about 71,000 acre feet. A reduction in that amount of water was made and a reduction in the plans, in that reduction the Tunnel Reservoir was delayed because of the outcome of that suit.

Recross-examination.

By Mr. James A. Greenwood:

The result of that lawsuit limiting the possible diversion from the Tunnel to 15,500 acre feet did not cause an abandonment of the project, but they did not get the amount of water they originally contemplated. The original purpose was to take all the water they could possibly get and divert through the tunnel. That purpose had to be modified in accordance with the limitations placed on the original intent by the decree of the United States Supreme Court.
(1209) The "Tunnel Project", Greeley-Poudre project, "Greeley-Poudre System", is the idea of collecting all this water and taking it through. As to whether it was built by various independent appropriations to convey water to the tunnel, they were all decrees of equal standing.

[fol. 826] Redirect examination.

By Mr. William R. Kelly:

I understand the purpose now to be to get the 15,500 acre feet which the Supreme Court allowed to the system. There has not been any abandonment as to the intention to complete any of the works to divert that water.

Recross-examination.

By Mr. James A. Greenwood:

(1210) I have been down the east branch of the Laramie River practically the entire length and up three miles or so on the west branch. I am familiar with the relative location of the Skyline Ditch and the Tunnel. The diversion works of the tunnel are so located as to capture all the water, that comes immediately west of the east branch of the Laramie above the tunnel diversion works that is not taken by the Skyline. The amount of water that could be gotten through the tunnel through these sources would depend to some extent on what the Skyline got. They could get all the Skyline didn't get. If the Skyline Ditch didn't take any, they would probably get the 15,500.

[fol. 827] Abraham Akin, witness in behalf of defendant.

Direct examination.

By Mr. Wm. R. Kelly:

I live at Fort Collins. Have lived at Fort Collins and (1211) vicinity since 1880. My business has been farming and stock raising, and I have been connected with the water company.

I have been engaged in farming and irrigation enterprises practically all my life, in this Valley, the Cache la Poudre and the Laramie.

I am the same Mr. Akin who testified in the former trial of the suit of Wyoming against Colorado in 1913 and 1914.

I own a farm out southwest of Fort Collins and I helped build the Pleasant Valley Canal. I was a director in the Pleasant Valley Lake Canal up to 1902.

I have been practically connected with the Greeley-Poudre or Laramie-Poudre project from 1902 up to this time. I was one of the original organizers of the first company, and then I was with them right along up until now. I (1212) had charge of the field work and the construction nearly all the time up to the last few years.

I was one of the locators of the original enterprise from the Laramie River and have been continuously engaged in the development of that enterprise up to the last two years.

In the surveying of the ditches and diversion works, I was practically with the engineers all the time, and my duties were to keep supplies and look after the moving of different things on the different parts of the system.

I was engaged in the construction on the Laramie River, on the plains, or distributing canals, and the storage ditch. I was engaged with the construction prior to the trial of the previous suit between these two states.

[fol. 828] Prior to 1909 I had charge of the crew of men working on the Upper Rawah Ditch. Mr. Link was foreman up there. I bought the supplies and had them freighted (1213) up there. I had charge of the crews of men working on the reservoirs and canals on the Laramie River, and on Mitchell Lakes, and on the other side, and the Poudre, and practically all the system in one place or another. That was in the fall and winter of 1908 and 1909.

Since 1908 and 1909 I have had charge of the Mitchell Lakes, and filling the lakes with water and turning it off in the fall. For five years I was manager of the ranches on the Laramie River owned by the Company.

I knew of the difficulties the company had through litigation. It is kind of hard to say what was involved in the litigation. The different companies were organized and they would try to finance the companies, and we would organize and then we would change the system more or less, and it would take more money, and it kept getting larger and larger all the time.

(1214) I know what comprised the system in 1911 when the Wyoming suit began and what comprises it now. It is the same. In 1911 it was carried on as an irrigation district enterprise and now it is a mutual irrigation company, owning the same works.

I know of the injunction suit of Wyoming to enjoin the taking of water from the Laramie River, in the Laramie-Poudre Tunnel project, which was begun in 1911. It practically stopped the whole work of construction of the system.

It has had its effect ever since that time until now, (1215) to prevent progress in a big way on the Laramie River project, and on the plains project.

I was familiar with the plans and purposes of the con-[fol. 829] struction on the Laramie River in this enterprise up to 1911. The Laramie-Poudre Tunnel project, in 1911, consisted in digging the ditches on the Laramie River side of the tunnel and the distributing ditches on the plains and the reservoirs. I had to do with locating a means to collect water from the Laramie River through engineers. The purpose, as to the means by which water was to be diverted from the Laramie River and the works were by building the West Side and East Side Ditches, the Upper and Lower Rawah Ditches and the tunnel. The tunnel itself was not capable of collecting a large amount of water, having in mind 15,500 acre feet, it could not be done.

(1216) In the surveys I had to do with there was included the West Side Collection Ditch running to the tunnel. The Tunnel Reservoir was not in the original plan. It was brought in a year or so later. I have been over on the Laramie River three or four times since 1913. I know the West Side Collection Ditch is now completed. There has been no change practically in the method of getting water to the tunnel out of the Laramie River watershed from what was planned in the original project. It is the same line.

(1217) The outcome of the Wyoming suit caused reduction in the manner of proceeding to completion of work of the Laramie tunnel project. We had to refinance and we had to get new men to help build it. We could not sell our bonds or stock at that time. The outcome of that suit caused a change in the manner of completion of the Laramie-Poudre tunnel project, because we had to cut down the acreage in the irrigation, but so far as ditches to conduct the water, we did not make any change. The company has not been able to finish the whole system.

[fol. 830] In view of the litigation and injunction suits, lien foreclosures, and eventually the war and the agricultural depression, as to whether the work has been carried

on in continuity of purpose and effort to complete it, I think they have done wonders. Those things have been obstacles to completion of the work and prosecution of it as it was carried on in 1911.

(1218) I have been at the altitude of 8500 feet in the vicinity of these ditches in the winter time in the past 30 years at Mitchell Lakes in Northern Colorado, near Log-Cabin, at practically the same altitude as the Laramie-Poudre Tunne-. I have observed fluctuation in the flow of the streams at that altitude in the winter months in the different hours of the day. I would say in February the high point of flow in streams in that altitude would be in the afternoon, about 4 o'clock. The West Side Collection Ditch was projected to run from the tunnel to McIntyre Creek. It was to intercept tributaries of the Laramie River and conduct them to the tunnel. It is not any different now.

(1219) The Upper Rawah Ditch is not able to furnish to the tunnel 15,500 acre feet, or a substantial part thereof, because it is higher up on the mountains and does not catch the runoff early enough in the spring.

The engineers of the tunnel project and collection ditches at the time they were being formulated were Zac T. Duvall, who is now dead, and R. Q. Tenney. He is also dead.

There has never been a year since they started the system that they have not done some work on it at some place.

I have had charge of practically all the irrigation of the meadows and ranches of the Laramie River Valley for five years. I am familiar with the methods of irrigation in the [fol. 831] Laramie River followed in the State of Wyoming, across the line, only as I have been up and down the river. From my observation there is no essential difference in the (1220) irrigation of the other side of the line. That system is that they build these ditches along these meadow lands and flood them.

As to the effect of such method of irrigation in depletion of the supply of the Laramie River, I don't think there is much difference in the way the ditches are built up there. The ditches are built from the bed of the river. They have no diversion dams in the river, and they built the ditches on the ranches largely at the upper end and took them down, and the water that goes over practically irrigates the meadows as it goes down. It doesn't take much time for the water to get back into the river.

I have been familiar with the method of irrigation in that valley since 1902, over 30 years. The manner of irrigation is the same today as it was then. That method of irrigation is necessary.

Cross-examination.

By Mr. James A. Greenwood:

(1221) I am familiar with the Upper Rawah and Lower Rawah Collection Ditches. I don't know whether or not it is the intent of the Greeley-Poudre Irrigation Company to abandon the outlet to the Upper after the Lower Rawah Collection ditch is finished. They never would abandon it. They expect to operate the Lower in addition to the Upper.

In a way the Lower and Upper Rawah Ditches convey the same water through the tunnel. There are two benches on that mountain. The lower bench comes off in the early spring and the upper bench comes later; but practically they come down the same creek. The Upper Rawah Ditch is not capable of getting the early water. The purpose of [fol. 832] the Lower Rawah Collection Ditch is to catch the water that (1222) comes early that could not be collected by the Upper. You catch additional water by operating both ditches, more than just from the upper.

There has never been a year since I have been connected with the project and knew anything about it that there has not been some work done in the development of it, both in the Valley part of the system and on the Laramie side. In the years 1915, 1916 and 1917, they put in some new headgates over there, and they strengthened that intake ditch from the west fork of the Laramie down to the tunnel. That is development of the ditch company's system. It is putting in improved devices for operation.

In the years 1918, 1919 and 1920, in the Laramie Valley, I don't think they did anything.

(1223) In 1921 there was not much done except to repair the system. Practically all the work done on the Laramie side during the years 1915 to 1929 was in maintenance work, to keep the system they had operating and in condition to work. The substantial expenditures was on the distribution system and reservoir system in the Poudre Valley. I think there was not any work done toward the completion of the Lower West Side Collection Ditch between the years 1921

and 1929. It was in 1929 they renewed construction, and the next year completed, the West Side Ditch.

I don't know how much water was taken through the Laramie-Poudre Tunnel from Rawah Creek in 1931.

Redirect examination.

By Mr. William R. Kelly:

(1224) I am familiar with the method of construction used on those ditches on the Laramie River in 1911. It was done by handwork, practically, by different contracts. The methods have certainly changed. Now there are steam shovels [fol. 833] and excavators, and everything. The ability to get heavy machinery in there has certainly been changed. When we started up there it used to take us about seven or eight days to get the machinery in there, and now you can get in there with it in 24 hours, almost. In 1911 the roads were such that the only way you could bring power shovels (1225) in there was a piece at a time. There has been constructed an improved road down through the Laramie Valley, and up to the Poudre River to the top of Chambers Lake, giving acess to the Tunnel, a shorter way than before. We used to pay $1.25 a hundred pounds to freight from Fort Collins to the West Portal of the Tunnel, and we paid $1 a hundred to the East Portal of the Tunnel. It is just about half that much now. The distance and facility of getting in there from Fort Collins have been affected, in that we used to have to go around by Tie Siding and Laramie City. That was about 120 miles. By Chambers Lake it is about 80 miles.

[fol. 834] L. C. Moore, witness in behalf of defendant:

Direct examination.

By Mr. Wm. R. Kelly:

(1226) My address is Fort Collins, Colorado. I have lived in Fort Collins 46 years. I have been engaged in banking most of the time, as well as interested in ditches, farms, etc. I have been connected with the development of enterprises in Northern Colorado, in the Cache la Poudre Valley. They

have been enterprises that brought water into this Valley from other valleys in the State of Colorado.

Some of these enterprises are:

The North Poudre Irrigation Company, bringing water through Cameron Pass and from the Michigan River. That is a tributary of the North Platte. It is a part of what is known as the North Poudre System. I would say it irrigates 30,000 acres.

I have been a stockholder for a good many years in The Water Supply and Storage Company that brings water through (1227) the Skyline and the Laramie-Poudre from the Laramie River.

I have been a stockholder, and part of the time a director, and part of the time President, since about 1910, I believe, in the Poudre Valley Reservoir Company, which is now known as The Laramie-Poudre Irrigation Company.

I have been familiar with what is known as the Greeley-Poudre or Laramie Poudre system from its first inception, about 1901 or 1902. I am familiar with its development up to the year 1909, and since. I have been with its works and different project works during that period of time.

I am familiar with the Laramie River Valley in Colorado and the works that were being constructed on the Laramie River Valley in Colorado, under the Greeley-Poudre or Laramie-Poudre project, in 1911. I am familiar with it now. (1228) I am back and forth frequently to that system of works in the Laramie River Valley.

[fol. 835] While I have not kept track of the number of times I have been over on the Laramie River maybe I have been up there six or seven times a year.

Speaking of the system of the Laramie River in a general way, it is the same system which was in progress of construction in 1911. They changed the name a time or two, but it is the same system. In 1911 it was known as an irrigation district, a municipal corporation, and now it has been changed to the corporate entity of a mutual irrigation company. In this mutual irrigation company, the shares of stock represent rights to take a pro rata part of the water and appropriations of the system.

I know the condition as to progress or completion of those works when the Wyoming suit started in 1911, and the ex-(1229) tent to which the works are now completed. The work was stopped when that suit was started. Nobody

would advance any money. When the suit started, the work stopped more or less. The system of ditches in the Laramie River basin was partially completed and they stopped right there. It was impossible to continue the work while that suit was pending.

What is known as the Greeley-Poudre or Laramie-Poudre as a whole, consisted of the tunnel to carry the water from the Laramie River to the Poudre River, and on the Laramie River side it was collection ditches, and the Link Lakes, and all those things together to bring the water from the West Portal. The tunnel itself is not capable of collecting any substantial amount of water.

(1230) It is necessary to have all the different ditches and tunnels to make the project a success. As to the means out of that old Laramie River system by which water is actually diverted from the tributaries of the Laramie, the West Side Ditch carries the water from the Rawah back to the west [fol. 836] portal of the tunnel and there is the East Side Ditch, which is not completed, for carrying the water from Deadman back to the west portal of the tunnel, and when you get over there, it comes through the tunnel over to the Poudre River.

In 1911 to get water from Rawah and intervening creeks into the Cache la Poudre River, they had a ditch constructed which we now call the Upper Ditch, which brought the water and delivered it into the Laramie River up above the tunnel quite a little distance. The present West Side Ditch is just a short distance above the west portal.

The lower or West Side Ditch was not completed in 1911. It has been completed since. The line is the same exactly as it was in 1911.

(1231) The ditch as now constructed serves exactly the original intent as planned by the Greeley-Poudre Irrigation system.

Following 1911 there were difficulties toward completion of the Greeley-Poudre system, in that when the suit was started the work had to stop. We couldn't raise money. There was really no new work done after the completion of the suit which was about 1922. During that period very little development work was done on the Poudre Valley side of the system. What development work was done was not done directly by the Greeley-Poudre Irrigation District. The Great Northern Water Supply Company did a lot of

work on the old Poudre Valley Canal between 1919 and 1926. Probably $150,000 was spent on that work. That company took over the part that was called the Poudre-Valley Canal, which was part of the whole project that was lost to the Greeley-Poudre through a foreclosure.

[fol. 837] The party that foreclosed sold it to the Great Northern and it was put back into the system known as the Laramie-Poudre (1232) or Greeley-Poudre system, which is now a mutual irrigation company, called The Laramie-Poudre Irrigation Company. It is merged in one system at the present time. The liens of those who had constructed the works, or put in the original cost of the system, were all merged into the present Laramie-Poudre Irrigation system. That was set about at the conclusion of the Wyoming suit. I think in every instance the holders of the claims or obligations in the works took stock in the new company for their interests.

They always had in mind the purpose to complete the work on the Laramie River as soon as it could be reached. To carry out that purpose they organized the West Side Construction Company and built the West Side Ditch.

(1233) That was a construction company. They had a contract that they are yet to be paid from the proceeds of water run through the tunnel and they got part of it in stock. It was pretty difficult to finance those things. Plans to complete was started right away, but the work in repairing the tunnel and getting the West Side Ditch constructed was started about 1929, by the West Side Construction Company.

The West Side Ditch as constructed is on the same line and same plan as was under process of construction for diverting water from the same supply in 1911.

As a man experienced in irrigation development in this region, I figure that the effort to complete this irrigation enterprise has never been stopped from 1911. It has been continued as fast as the circumstances would permit.

(1234) The purpose is to carry out the original plan all the time. As to whether it — fully completed yet, I don't think any ditch is ever completed. They are making mighty [fol. 838] good progress and operating alright. As to whether conditions have been good, in the way of ability of farmers to finance construction of irrigation works in this valley the past twenty years, I think they have been pretty

good, considering the condition of the world and finances and the condition of the farmers. I think they have done wonders to do as much as they have.

I am now president of The Laramie-Poudre Irrigation Company.

Cross-examination.

By Mr. Greenwood:

I have been president since January 10, 1931. The directors are Charles R. Evans, Mr. Robinson, of Denver, Mr. Macey, and Mr. Shaffer and myself. This is a mutual (1235) company. The stock is considerably scattered. The farmers have a lot of stock. The claim holders under the old works have stock, some are not farmers, but it is owned mostly by farmers. As to whether the stock has a value in the hands of some one not a farmer, or a market value, I heard an offer of $50 a share a year ago. You could buy a lot of it at that price.

The West Side Construction Company Officers are myself, president, Rodney Hughes, Secretary, Charles R. Evans, vice-president and manager. They are the directors. Mr. Evans and I are also directors of The Laramie-Poudre Irrigation Company. When we made this contract, I was not an officer of The Laramie-Poudre Company.

(1236) The Laramie-Poudre Irrigation Company owns the West Side Collection Ditch, the rights of way, the filings and decrees, etc., which go to make up any ditch company. [fol. 839] The Construction Company, to guarantee payment of the cost of construction, has a contract that the stockholders of the West Side Ditch are to receive a portion of the value of the water delivered by them to the tunnel and the balance in stock in The Laramie-Poudre Irrigation Company. They receive a portion of the water until they get their money back, about $90,000. There is no set price for converting the water into money. Every year the value of the water is different. Market value determines that, whether it is scarce or plentiful. The price advances when it is scarce.

(1237) The West Side Construction Company does not own the water. They receive a portion of the proceeds. The water is marketed in the Poudre Valley. No one person or group is under contract to buy the water of the

West Side Construction Company. The stockholders in The Laramie-Poudre not able financially at this time to pay their assessments have waived their right to the water in view of waiving of the assessment, or something in that way. A man who owns property can do as he pleases about it. The stockholders who own the stock in the Laramie-Poudre own the ditch to that extent.

(1238) The West Side Construction Company are all stockholders of The Laramie-Poudre Irrigation Company and they receive part of the pay in stock. There are some people who own stock in the Laramie-Poudre who do not have any stock in the West Side Construction Company. I think these people who do not own stock in the West Side Construction Company have a claim on this water delivered from Rawah Creek, the same as every stockholder. The stockholders of the company run it. They have annual meetings, decide on the policy, and the officers of the company follow the desires of the stockholders.

[fol. 840] We use our best ability to realize just as much as we can for the water that comes through the tunnel.

(1239) I can't tell offhand how much money the Laramie-Poudre Irrigation Company owes the West Side Construction Company, but it is the full cost, less the value of the stock they gave in part payment, and the small payment they have been able to apply—it is seventy or eighty thousand dollars.

A little over 13,000 acre feet was delivered through the tunnel by the West Side Collection Ditch last year. Its value was around seventy-five to one hundred dollars (1240) to a million cubic feet. Up to the present time we have run the water collected by the West Side Collection Ditch just as tunnel water. It does not all come from the West Side Ditch but we treat it as a whole without separate accounting of the amount of water coming from the west branch and that from Rawah Creek. The water all belongs to The Laramie-Poudre Irrigation Company and is sold as its property when delivered through the tunnel, regardless of where it comes from. It is sold each year to the users in the valley of the Poudre. Every year water has a different market value. A stockholder of The Laramie-Poudre Irrigation Company does not obtain water even though he hasn't the money to pay for it. He waives the right to the

water. He has so far. Some not stockholders purchase water from the company.

(1241) It is true about everything that it is really the fellow that has the money who can get the water whether he is a stockholder or not. In this company, if he has the money, he can get it; if he don't, he oughtn't to. The only advantage in being a stockholder is, that it creates a preference in his favor if he has the money to buy the water, but that question has never arisen yet. There has never been a controversy between a stockholder and another customer. [fol. 841] As to whether we always have plenty of water for both, that is hard to answer. Water is always needed, and people desire a great deal more than they are able to purchase. Last year and the year before were dry seasons. There wasn't plenty of water any place.

There has never been a stockholder who wanted water that couldn't get it, and we have also been able to sell to another customer. That has always been the case.

The money we have derived from the sale of water each year has exceeded what we have paid out in maintaining. (1242) The surplus belongs to the company. It is applied on the obligations of the company. There are a lot of them.

Redirect examination.

By Mr. William R. Kelly:

I can only give my opinion on what was the financial condition of what is known as the Greeley-Poudre enterprise in 1922. I think they were so badly involved that they were absolutely hopeless. There were a multitude of lien suits pending against it, or arising out of the construction. The Wyoming suit left us flat, we couldn't do anything. The lands of the farmers under the system were bonded by irrigation district bonds for about $40 an acre, I believe. (1243) The farmers had no way on earth to raise money.

The system was not completed then, and they had no ability to raise money to complete it without outside capital, but it had gradually improved right along. It is not completed yet, but there has been a constant effort of the stockholders, and friends that they could induce to assist and co-operate, to go ahead and make it a completed

system. In 1923 the canal was not completed so that it would run water so far as McGrew out to the main body of the land. The collection system on the Laramie River was not completed so that it could get even the amount of [fol. 842] 15,500 acre feet. The farmers and people living under the system have made every effort, I think, to complete the work. They frequently met and passed resolutions, and couldn't raise the money, and they had to try some other plan, and they kept it going that way. Under Mr. Parker's supervision, I think the stockholders did a good deal of work on different parts of the system.
(1244) I believe it was necessary to form it into a mutual irrigation company in order to carry on the means of prosecuting the work. That was the intent.

It is my understanding of a mutual ditch company operated under the laws of Colorado, that each shareholder is treated exactly alike.

When this mutual company was created as a corporate entity to carry on the system, to complete the construction, they had to get outside capital and make a secondary corporation, and arrange for the construction. It takes a lot of time to raise money to build a ditch like that, the way times have been in the last years. There has been effort to get the money and prosecute the work with continuity and energy from 1922.

The West Side Construction Company represents a bunch of investors and farmers who put up the money to build the ditch to get the water. As a means of assuring them repayment, they were given a lien on the proceeds of the water that would be produced and some stock. The amount of the debt, in round numbers, is $90,000, exclusive of the amount (1245) that was paid in stock, of The Laramie-Poudre Irrigation Company. I don't believe I can give the exact amount of the stock. The $90,000 was the cash indebtedness.

[fol. 843] At the time of reassembling the system and getting it under way to proceed again after 1922, the title to the works and appropriations was all transferred to The Laramie-Poudre Irrigation Company. At to whether title was put into The Laramie-Poudre Irrigation Company by means of a sheriff's deed representing the liens foreclosed against the company, the attorneys claimed that it was all regular, and the object was to merge all the title in The

Laramie-Poudre Irrigation Company, and I believe that was done. I believe all the water of the Laramie-Poudre Irrigation Company, what was formerly known as The Greeley-Poudre Irrigation Company, is in the stockholders, through the corporate entity of the Laramie-Poudre Irrigation Company. The stockholders of the Laramie-Poudre Irrigation Company own all the water of what is known as the Greeley-Poudre system.

(1246) The water of the Greeley-Poudre Irrigation system derived from the Laramie River and other sources of the system has been applied to the lands of owners in that district clear to the McGrew Reservoir, about 30 miles.

In order to keep on with the development of the enterprise they levied assessments against the stock of the company. It was the intent of those assessments to pay the maintenance and operating costs and interest on indebtedness of the company. There is still a large indebtedness.

It has been necessary in order to carry on the construction to get some stockholders to relinquish their right to the water itself and allow their water to be rented in order to produce the money and every dollar of that money is applied upon their assessments.

All of that money, 100%, goes to the payment of labor and material and construction and interest on the debts of the company and in development of the works of the [fol. 844] contemplated plan. There is nothing taken at all, even for office or salaries. The President and Vice-President never draw a cent of salary. We have to pacify the creditors.

(1247) There are difficulties all the time in raising money to carry on construction work in the development of the enterprise. It is a hard job for us. It is the intent to complete the project as fast as conditions of the farmers and financial difficulties will permit. I believe we will eventually make all that land valuable to the landowners. There has never been any profit in it at all, and I don't know anything to encourage the belief there will be.

I think the use of 15,500 acre feet from the Laramie River is absolutely necessary for the success of the system. I have myself advanced substantial sums of money to keep the (1248) construction work going. There is a fine spirit of co-operation on the part of the landowners, but when they cannot obtain money how can they do it?

Recross-examination.

By Mr. James A. Greenwood:

Prior to the incorporation of the Laramie-Poudre Irrigation Company, the properties now owned by it were in the name of The Greeley-Poudre Irrigation District. Then when the fellow that held the mortgage on what we call the Poudre Valley Ditch foreclosed, I think a pool, or trustee, held it for a number of years, and they sold it to the Great Northern Water Supply Company, and then afterwards that was again merged back into the Laramie-Poudre Company. I think there may have — one hundred different people who held bonds, secured by mortgage on the property. I believe that was (1249) foreclosed. When the Great Northern sold this property to the Laramie-Poudre there was no given amount of value put on it. The Laramie-Poudre Irrigation Company bought [fol. 845] the holdings of the Great Northern by assuming their bonded debt of $400,000 and giving stock for the balance. The mortgage is on the system yet. They bought the property subject to the mortgage. I think there is still about $385,000 due on the mortgage.

Redirect examination.

By Mr. William R. Kelly:

(1250) This mortgage loan of something like $400,000 on the Poudre Valley part of the system, which was lost for a time out of the system after 1911 by foreclosure and the liens of the men who did construction work on the main part of the system, for material and labor, and constructing the works up to about 1912, were all merged and there was formed a mutual irrigation company. In that mutual irrigation company, The Greeley-Poudre Irrigation District held a very large block of stock. I don't know the amount. The rest of the initial issue of stock went to various kinds of liens claimants. Some people got stock by labor, some bought stock, and they tried to satisfy lien holders with stock. Every cent of the proceeds of water in that mutual irrigation company has been used in the development of the works of the company and paying its indebtedness.

(1251) (Adjourned until Tuesday, June 6, 1933, at 10 A. M., to meet in Fort Collins.)

[fol. 846] J. H. Rowe:

Direct examination.

By Mr. Lawrence R. Temple:

(1252) I reside in Greeley, Colorado, and am 69 years of age; have lived in and about Greeley since 1878; have been connected with The Water Supply and Storage Company both as an officer and stockholder during most of that time. I first became a (1253) director in 1894 following the organization of The Water Supply and Storage Company in 1891. That company is the owner of Chambers Lake, Lost and Laramie Lakes, the Skyline Ditch and the Cameron Pass Ditch. I helped finish the preliminary survey of the Skyline Ditch or Laramie River Ditch in August, 1891, extending from Chambers Lake to the west fork of the Laramie River. The ditch (1254) was constructed in 1892 and 1893 and water was diverted through the Skyline Ditch from the Laramie River into the watershed of the Cache la Poudre River in 1894, and it has been continuously used for irrigation purposes since that time. The Water Supply and Storage Company is a mutual ditch company and is not organized (1255) for profit, assessments being levied to pay for the maintenance and extension of the project. Assessments are levied each year for a sufficient amount to carry on the company. Each share of stock is entitled to an equal amount of water to every other share, or in other words, each share of water is entitled to one 6/100 part of all of the water belonging to the company each season. The principal crops raised under the system are sugar beets, potatoes, and alfalfa. At the time I was on the Board of Directors, beginning (1256) in 1894, the company was also the owner of what are known as Lost and Laramie Lakes. These are two small lakes lying in a northerly direction from Chambers Lake. They are small basins filled with water from the run-off from the adjacent hill and there was no water course such as could be used for filling. In 1894 or 1895 our company made a small cut into Chambers Lake and the water from the lakes was carried into the lat-
[fol. 847] ter and thence through the system for the benefit of the stockholders. These lakes were used (1257) through this method until about 1912, when a better connecting ditch was constructed and the dams were raised. The

water from these lakes is necessary for use under the system. We have used such water whenever it was available for irrigation purposes under the system since 1894.

The company also owns other trans-mountain diversions than the Skyline Ditch and the Lost and Laramie Lakes. These trans-mountain diversions being the Grand River Ditch, bringing (1258) water from the head waters of the Colorado River, and the Cameron Pass Ditch bringing water from the head waters of the Michigan Creek, a tributary of the North Platte River. The Skyline Ditch has a decreed priority for 400 second feet of water out of the Laramie River of date 1891.

Cross-examination.

By Mr. James A. Greenwood:

(1259) My only connection with The Water Supply and Storage Company at this time is that of a stockholder. I am not at this time either an officer or a director.

[fol. 848] A. C. KLUVER:

Direct examination.

By Mr. Lawrence R. Temple:

My name is A. C. Kluver, age 74 years; have resided in Fort Collins, Colorado, or its vicinity since 1882. My (1260) business is ranching and farming. I have been president of the Board of Directors of The Water Supply and Storage Company since 1910 and have been a member of the Board of that company (1261) since 1894. The ditch company is a mutual corporation organized for the purpose of carrying water to the stockholders. It is not a corporation for profit. There are 600 shares of stock, and the cost of operation and improvement is provided through assessment on the stock. The average assessment during the past five (1262) years has been about $165.00 a share. The physical properties of the company are the Larimer County Ditch, which is the main distribution canal; the Skyline Ditch, also known as the Laramie River Ditch, which brings water from the Laramie River, across and through Cham-

bers Lake, thence down the Cache la Poudre River; the Grand River Ditch, which brings water from the Colorado River; (1263) and the Cameron Pass Ditch, which brings water from the Michigan Creek, a tributary of the North Platte River into Joe Wright Creek, a tributary of the Cache la Poudre. The company also owns fourteen reservoirs with a storage capacity of about one and a half billion cubic feet. Of these reservoirs, Chambers Lake, Grand River or Long Draw Reservoir, Lost, Laramie and Lily Lakes are situated in the mountains at the head streams of the (1264) Cache la Poudre River. The various ditches of the company, together with their decreed priorities are as follows:

Larimer County Ditch, priority No. 100, of date April 25th, 1881, for 463 second feet, decreed in Water District No. 3;

Skyline Ditch, priority No. 23, of date August 7th, 1891, for 400 second feet, in Water District No. 48;

[fol. 849] Cameron Pass Ditch, decreed priority No. 10, of date July 30th, 1882, for 10 second feet, in Water District No. 47.

Grand River Ditch, priority No. 83, of date August 11th, 1906, for 524.6 second feet in Water District No. 51.

(1265) The several reservoirs of the company and their decreed priorities are as follows:

Chambers Lake, priority No. —, of date July 12th, 1882, for 134,000,000 cubic feet by construction; priority No. 106, first enlargement, of date May 28th, 1910, 156,000,000 cubic feet additional; priority No. —, second enlargement of date December 3rd, 1922, 95,699,200 cubic feet additional.

Reservoirs Nos. 2, 3 and 4, priorities Nos. 4 and 5, of date October 1st, 1882, for 55,000,000 cubic feet by construction; priority No. 39 of date December 12th, 1900, 18,369,500 cubic feet additional.

Rocky Ridge or No. 1 Reservoir, priority No. 25, of date September 1st, 1891, for 205,853,620 cubic feet by construction.

Long Pond Reservoir No. 5, priority No. 26, of date September 1st, 1891, for 175,864,400 cubic feet by construction.

Lindenmeier Lake, priority No. 27, of date February 16th, 1892, for 40,000,000 cubic feet by construction.

Black Hollow Reservoir, priority No. 86, of date February 20th, 1906, for 280,000,000 cubic feet by construction; priority No. —, of date October 5th, 1918, for 94,000,000 cubic feet additional by first enlargement.

The company is also the owner of a number of other reservoirs which are not at this time decreed by the Courts of Colorado and for which application for decrees is now pending as follows:

Kluver Reservoir and Grand River Reservoir for a total claimed capacity of 303,648,000 cubic feet, as of date May 1st, 1911, and subsequent.

There is also pending before the Court petition for adjudication of Lost, Laramie and Lily Lakes in Water District No. 48, for a total claimed capacity of 26,041,030 cubic feet. The company also owns and operates two lakes known as Curtis and Richards Reservoirs, known as stock filling reservoirs, which have a capacity of 128,580,875 cubic feet. These latter lakes are used to store water during the irrigation season which may not be (1266) immediately required by the stockholders. The company also [fol. 850] owns 24.72 second feet of water out of what is known as the Pioneer Ditch with priority Nos. 5 and 12, of date March 1st, 1862, and September 15th, 1864, in District No. 3; the Henry Smith Ditch with priority No. 84, of date April 1st, 1878, for 7.23 second feet and 4.67 second feet decreed to the Canon Canal under priority Nos. 28 and 56, of date March 15th, 1868, and March 20th, 1873. These last mentioned priorities have been transferred from the headgates of the original ditches to the headgate of the Larimer County Ditch of this Company by proceedings in the District Court of the State of Colorado in and for Larimer County to change the point of diversion of said waters. There is also pending in the District Court of Larimer County, Colorado, petition for additional diversion in favor of the Larimer County Ditch for an additional priority amounting to 326 cubic feet per second by (1267) reason of enlargement of the ditch. The Larimer County Ditch and Chambers Lake were built by the predecessor company of The Water Supply and Storage Company known as the Larimer County Ditch Company (Certificate

of Incorporation of which is introduced herein as Exhibit M), and The Water Supply and Storage Company is the successor in title and interest of the Larimer County Ditch Company and is the owner of the Larimer County Ditch and Chambers Lake by purchase. The Skyline Ditch was built by The Water Supply and Storage Company but the work had been started by the predecessor company on that structure. The Skyline Ditch was built in 1891 and 1892 and completed in 1894, and at the same time the same company built a cut from Lost and Laramie Lakes into Chambers Lake and diverted water from those lakes and the Skyline Ditch from that time each year when water was available, and the water so diverted has been used for the irrigation of the lands under the Larimer County Ditch by the stockholders of (1268) The Water Supply and Storage Company. All of the waters so diverted and used [fol. 851] have been and are necessary for the irrigation of the crops on the lands belonging to the stockholders of the company, and many times the water belonging to the company has been insufficient to properly irrigate such crops. Lily Lake is a small basin above Lost and Laramie Lakes and was built in 1912. It is conencted with Lost and Laramie Lakes and the three are (1269) operated together. The first time the right of the company to use these three lakes was denied was in the year 1932 when the State Engineer for Colorado cut the bank of the lower lake and turned the water down into the Laramie River. The cut was made over our protest and we were informed it was done because the Wyoming authorities demanded that the lakes be cut. We had always believed a decree had been entered for storage right in these lakes until about December, 1929, and we immediately took steps for the perfection of our rights to store in those lakes. (1270) With reference to the running of water charged to the Skyline appropriation through the Laramie-Poudre tunnel in 1926, I recall the circumstances that the Skyline Ditch broke and that in order to get the water to which we were entitled we made arrangements to carry the water through the tunnel during the fall season. We paid about $7.00 per million cubic feet to the tunnel people for the water which was carried for us. We (1271) had carried water through the tunnel in other years when the Skyline Ditch was out of condition and have always paid for the accom-

modation. Our decree for diversion of waters of the Laramie River through the Skyline Ditch is prior in point of time to that of the Laramie-Poudre Tunnel, and we have never carried water through that tunnel except on our own decrees.

(1272) Mr. Temple: At this time I wish to offer and read in evidence that part of defendant's Exhibit F, appearing on pages 1272 to 1275 inclusive, (Exhibit F being decree [fol. 852] of the District Court of Larimer County, Colorado, in case No. 1247, entitled, "In the Matter of the Adjudication of the Priorities of Right to the Use of Water for Irrigation in Water District No. 48, State of Colorado"), as follows:

"No. 22—The Laramie River Ditch.

"The ditch is owned by the Water Supply and Storage Company, and was constructed and is used to irrigate 30,000 acres of land and for the filling of reservoirs.

"Its headgate is located upon the right bank of the West branch of the Big Laramie River, at a point from which the quarter corner of Sections Eleven and Fourteen, Town 8 North, Range 76 West, bears North 10 degrees 60 minutes East 2817 feet. The ditch is smallest at its headgate and upper end, and where it draws its chief supply of water from the West branch of the Big Laramie River, and it increases in size and capacity from the headgate down to its lower end at Chambers Lake and intercepts and appropriates the waters of Two and a Half Mile Creek, Three-Quarter Mile Creek, Half Mile Creek and other small branches crossing the line of the ditch between its headgate and its mouth. The capacity of the ditch at the headgate is 242 cubic feet per second, and it increases from this point towards the lower end of the ditch to a capacity of 400 cubic feet per second. It appropriates 242 cubic feet of water at its headgate from said West Branch and appropriates all the waters of the streams intercepting the line of the ditch and crossing the same, up to a total of 400 cubic feet of water per second of time.

"The ditch is five miles long, 12 feet wide on the (1273) bottom, 18 feet wide at the top, 5.5 feet deep, and its grade is 15.84 feet per mile at the lower end, 5.28 feet per mile through the middle, and 10 feet per mile at the headgate.

"The ditch is entitled to Priority No. 23 by construction, of 242 cubic feet of water per second at the headgate, and 158 cubic feet per second from tributaries crossing the line of the ditch, being a total appropriation of 400 cubic feet of water per second of time, all of which bears date from the 7th day of August, A. D. 1891."

"No. 22. The Laramie River Ditch.

"That ditch numbered twenty-two, named The Laramie River Ditch, The Water Supply and Storage Company, claimant, is a ditch constructed and used for the irrigation of about 30,000 acres of land and for the filling of claimant's reservoirs Nos. 1, 2, 3, 4 and 5 and Chambers Lake. Its headgate is located upon the right bank of the West Branch of the Big Laramie River, at a point from which the quarter corner of Sections 11 and 14, Town 8 North, Range 78 West, bears North 10 degrees 16 minutes East 2817 feet. The ditch is smallest at its headgate and upper end, where it draws its chief supply of water from the said [fol. 853] West Branch of the Big Laramie River, and it increases in size and capacity from the headgate down to its lower end at Chambers Lake and intercepts and appropriates the waters of Two and a Half Mile Creek, Three-Quarter Mile Creek, Half Mile Creek and other small branches crossing the line of the ditch between its headgate and its mouth. The capacity of the ditch at the headgate is 242 cubic feet of water per second of time, and said amount is augmented by the increasing carrying capacity of the ditch toward its lower end and the appropriation of the waters of the intercepting streams along the line of the ditch, as aforesaid, to a total capacity of 400 cubic feet of water per second of time. Said ditch is entitled by construction and appropriation of water to use to Priority number twenty-three, for the uses aforesaid, and for the benefit of the party or parties lawfully entitled thereto;

"It is hereby adjudged and decreed that there be (1274) allowed to flow into said ditch, for the uses and benefits aforesaid, under and by virtue of said appropriation by construction, Priority number twenty-three, two hundred and forty-two cubic feet of water per second of time at its headgate, and also one hundred and fifty-eight cubic feet of water per second of time from the tributaries crossing the line of the ditch, being a total appropriation of 400

cubic feet of water per second of time; the appropriation of all which water took effect on, and said priority dates from the 7th day of August, A. D. 1891.

"And it is further adjudged and decreed that the said The Water Supply and Storage Company, Claimant herein, be entitled by reason of the construction and operation of said ditch, and its use in carrying and delivering water for storage purposes for irrigation, to Priority numbered One of this Water District. When not needed by prior appropriators for immediate irrigation, the said Company shall have the right to take and carry and store in its reservoirs Nos. 1, 2, 3, 4 and 5 and in Chambers Lake, water from said West Branch of said Big Laramie River and its tributaries to the amount of 5,000,000 cubic feet annually. And said reservoir (1275) Priority Number One shall take effect on and bear even date with the priorities hereinbefore decreed to said The Laramie River Ditch, to-wit, the 7th day of August, A. D. 1891."

(1276) The first time the company found that it had no decreed priority for Lost, Laramie and Lily Lakes was just prior to December, 1929, and we had Mr. Newkirk, the engineer of the company, immediately make the survey and fillings. The Larimer County ditch is approximately 70 miles long and the distance from the headquarters of the company at Fort Collins to the head of the Skyline Ditch is about 70 miles, and it is about 85 miles from Fort Collins to the head of the Grand River Ditch, making (1277) the [fol. 854] territory covered by the system about 150 to 160 miles. The indebtedness of the company at this date is $403,000.00, which is the balance of an old $500,000.00 indebtedness. That indebtedness is being reduced each year in accordance with the terms of the mortgage securing the indebtedness.

Cross-examination.

By Mr. James A. Greenwood:

I have been president of The Water Supply and Storage Company since 1910, and I am familiar with the detail workings (1278) of the company's system. The company keeps a record of the owners of stock and that record is in the possession of the secretary. We have generally one

man looking after the operation of the Skyline Ditch and the present operator has been with the company for about 20 years. He looks after the men and keeps account of the record of the discharge of water from the ditch and attends to the automatic register. His reports are made to (1279) the foreman at Chambers Lake, who in turn reports to the Water Commissioner, Mr. McAnelly, and his reports are sent to the State Engineer. The reports to the Water Commission are made in writing twice each week. The State Engineer and Water Commissioner each visit the Skyline Ditch occasionally, probably three or four (1280) times each year during the summer month. Their purpose is to see that the records are properly kept. There have been a number of years when we have been able to get more than 18,000 acre feet of water through the Skyline Ditch, but we have only been able to (1281) get more than that amount in 4 or 5 years since 1922. I recall that 1926 was one of those years and that 1932 was also one year when we might have received more but we were not allowed to take it. Our employee at the Skyline Ditch is not employed by the State of Colorado and our company pays for the operating of the automatic register at the point of discharge from the Skyline Ditch. Our (1282) priority being earlier than that of the Laramie-Poudre Tunnel, we have heretofore taken all of the water available to the Skyline ditch, and we [fol. 855] have also prior to 1932 taken the waters of Lost and Laramie Lakes in addition to the 18,000 acre feet. We did (1283) not approve or consent to the State Engineer cutting the banks in our lakes, but we do not expect to use them again until the Court decides this action. In 1926, the Skyline Ditch broke and (1284) we ran some water through the tunnel for the credit of the Skyline appropriation. That was done under a written agreement (a copy of which agreement appears in testimony of G. F. Smith, and is set forth in full at pages 1121-1122 of the transcript of the evidence (1285) herein). The stock of the company is divided into 600 shares, which entitles each share to 1/600 part of all of the water of the system each year, and each owner has the right to rent his water, if he so desires, for use under the same system. The company has never carried any water for outside users. The State Engineer never attempted to regulate or limit our diversion through the Skyline Ditch prior to 1932 for the reason that the com-

pany had never been able to get the entire amount of its appropriation granted (1286) by the State Courts. During 1927, 1928 and 1929 the records show that we were able to obtain more than 18,000 acre feet, and we have heretofore captured all the water of the Laramie River possible through the Skyline and the Lost Lake system, delivering the water through Chambers Lake and down the Poudre River, paying (1287) a transportation charge to the river of 5%. There is no physical connection between the Skyline Ditch and the Lost Lake system, although both enter and run through Chambers Lake. None of our employees are state officials or employed by the State, although Mr. McAnelly, the water commissioner, passes on the qualifications of any of our employees who have to do with the distribution of water. The man at the Skyline Ditch has been working on ditches (1288) and has measured water for many years and has furnished records of the water flow to our company from the Skyline Ditch.

[fol. 856] Redirect examination.

By Mr. Lawrence R. Temple:

(1289) Exhibit W is the water record of The Water Supply and Storage Company kept by the company from the reports of its foreman. (1290) Exhibits U and V are the reports sent to the company from the foreman at Chambers Lake twice each week. These reports are transferred to the water record, Exhibit W.

(1291) Copies of Exhibits U and V, showing the discharge from the Cameron Pass, Skyline or Laramie River Ditch, and the Grand River Ditch, of date June 20th, 1926, showing no discharge through (1292) Skyline Ditch.

Exhibit W, water report book for the month of June, 1926, from line 16 to line 24 inclusive, showing discharge of the Grand River Ditch, Laramie River Ditch (now Skyline) and Cameron Pass Ditch.

(1293) Recross-examination.

By Mr. James A. Greenwood:

Exhibits U, V and W are private records, but any one who wishes may have access to them at any time.

[fol. 857] Roy A. Portner, witness in behalf of defendant:

Direct examination.

(1294) By Mr. Wm. A. Bryans:

I am president of the Mountain & Plains Irrigation Company and have been since its organization in 1920. I have been engaged in irrigation enterprises for some years and first became interested in 1906. I owned some irrigation property or projects prior to the organization of this company. The company is capitalized for $100,000.

(1295) The property of the Mountain & Plains Irrigation Company is composed of foreign water divisions: Bob Creek Ditch, Bob Creek Extension, Columbine Ditch and Columbine Extension; the reservoir properties: Portner, Gilmore, Barnes Meadow, Peterson Lake, Hourglass, and Twin Lakes Reservoir, Timberline Reservoir, Comanche and Trap Lake Reservoir. All of these are mountain reservoirs except Portner and Gilmore. The reservoirs are a component part of the ditches, they are dependent upon the operation of the ditches. The Bob Creek and Columbine ditches and extensions produce water early, about the 15th to 20th of May and run along until about the first of July, and this water is used as a supplementary supply to direct irrigation in the Poudre Valley. The (1296) supplemental supply is not used as a rule until the 15th of July to the 10th of September. We store this water and keep it until demand is made for its use on late crops in the valley.

The water from Bob Creek and Columbine Ditches comes into this watershed and whatever amount is charged to this water system is in turn credited to the Poudre River in my reservoir for later use.

Bob Creek ditch where it discharges into the Poudre watershed is a pass between Nunn Creek Basin and the Roaring Fork Creek, the place where Bob Creek ditch discharges into Roaring Fork is about 8 miles from the Poudre River and from the place where it discharges it runs in a northwesterly direction to the headwaters of Nunn Creek or Bob Creek. At that point Bob Creek Extension goes west and southwest and taps unnamed streams.

[fol. 858] (1297) Bob Creek Ditch is 8,200 feet long and the extension is about 6,000 feet. Columbine Ditch is about 6,200 feet long. It is about half a mile south of the top of

Deadman Hill on the old State Road west of Log Cabin. It discharges its waters into the headwaters of the North Fork of the Poudre River, running in a south and westerly direction and intercepts two or three small streams and ends at Columbine Creek which empties into Deadman Creek. The two ditches are about three miles apart most of their course. Bob Creek or Nunn Creek and Columbine are tributary to the Laramie River.

I acquired title to Bob Creek and Columbine Ditches in 1919 in my own name and later conveyed to the (1298) Mountain and Plains Irrigation Company, which company is now the owner of these ditches. Title was acquired to Bob Creek Ditch from the Laramie & Weld Reservoir Company, and to Columbine Ditch from the Divide Canal and Reservoir Company. $3,500 was paid for Bob Creek and $3,500 for Columbine Ditch. The present investment of Mountain & Plains Irrigation Company in its system is about $600,000 and it is bonded for $115,000. The Company is a stock company and the water developed by the company is used by preferred right holders and rented as a supplemental supply to people who are short of water under existing systems in the Poudre Valley. The Company has no distributing ditch or system in the valley.

(1299) Preferred rights are a first preferred charge against Bob Creek and Bob Creek Extension and Columbine and Columbine Extension, and we agree to store this water to be delivered any time up until the 10th of September each year. The preferred right owners are not stockholders in the Company but are the owners of a distributive right within the water right itself. The company has received $150,000 on account of sales of preferred rights. There are 35 users of our water in the Poudre Valley. Some of the larger owners are The State Agricultural College 200 rights, United States Experimental Station 100 rights, Colorado-Portland Cement Company 160 rights. Some of the individual farmers are W. A. Drake, Inc., 71 rights; Warren Brothers, 35 rights; Larimer County Farm, 20 rights. This water is used as a supplemental supply to the regular [fol. 859] irrigation rights, direct flow rights. (1300) It is used for irrigation except the Colorado-Portland Cement Company and that is used for the manufacture of cement.

I first became familiar with Bob Creek Ditch about 1912 or 1914 and first became familiar with Columbine Ditch in

1914. I ran some water in Bob Creek Ditch in 1919 and in Columbine Ditch in 1920. It was just a small amount, as normally there is no water in those ditches late in the season, but there was a heavy rain and we got some, and it was (1301) delivered to me thru the Poudre Valley Ditch on Section 33-9-67.

Bob Creek Ditch was in good shape in 1919 with the exception of a little repair work. There were three small breaks and it did not take but a short time to close them up, and we built some new buildings that year too. Jim Johns was in charge of the work.

I saw the Columbine Ditch in 1914 and it had all the appearance of having run water, it was in the fall of the year and no water was running then. I would say that the ditch was capable of running water that year.

Water was run in both Columbine and Bob Creek ditches in 1920, and water has run each irrigation season since then. We (1302) ceased running water the 17th of June, 1932, because we had orders from the State Engineer. None has been run since that date. The State Engineer of Colorado asked us to wait until the controversy was settled.

For a 24-hour run Bob Creek reached a maximum capacity of 39.30 feet. That is the average flow as there is a greater flow at some hours than others. It might reach around 50 or 55 feet at the peak time. The maximum capacity of Columbine Ditch is about 29 second feet.

(1303) I understand the reason the State engineer issued the order to stop running water on June 17, 1932, was because Wyoming had made certain demands on them to have it stopped and Wyoming had made certain demands to that effect because of their interpretation of the decree of the United States Supreme Court.

[fol. 860] The width of Bob Creek varies, right at the timber cut I think it is about 14 feet wide, but when you get up a ways I would say the top of it is about 10 feet and the bottom is about 6. At the upper end it gets smaller. The grade of the ditch is five feet a mile. It is (1304) at an altitude of 9,975 feet and Columbine Ditch is 10,000.

In 1919 the water run in Bob Creek Ditch was applied to beneficial use and in 1920 the water run in Columbine Ditch was likewise applied to beneficial use. This is true of each year that water has been run in these ditches.

There is an adjudication proceeding pending in Larimer County now for a decree for Bob Creek. This is the proceeding that Wyoming is seeking to have enjoined in the Supreme Court of the United States. Columbine Ditch has been adjudicated.

The owners of preferred rights of the Mountain &
(1305) Plains Irrigation Company are wholly dependent upon Columbine and Bob Creek ditches for water.

The bulk of the water diverted thru these ditches is run in about 20 days, there is small amount earlier and a small amount later. In 1920 we diverted 2350 acre feet thru Bob Creek Ditch and about 850 to 900 acre feet thru Columbine Ditch.

Defendant's Exhibit X is a preferred water right of The Mountain & Plains Irrigation Company, covering water diverted thru Bob Creek and Columbine Ditches, and this is the form of the right which I have referred to in my testimony as a preferred right of that company.

(Defendant's Exhibit X is then offered in evidence.)

[fol. 861] Cross-examination.

By Mr. James A. Greenwood:

(1306) The Mountain & Plains Irrigation Company is a stock company. There are 1000 shares of stock of the par value of $100 a share. It is owned by Mr. Schureman and myself.

By foreign water diversions from Bob Creek and Columbine Creek and their extensions I mean water diverted from its natural course of the Laramie River watershed to the Cache la Poudre.

From hearsay I think water was diverted from Bob
(1307) Creek in 1902 or 1903, but from my personal knowledge it was diverting water in 1919. In 1920 it diverted 77,465,000 cubic feet. There has been diversion each year since that until the 17th of June, 1932.

Water was diverted from Columbine Ditch in 1920 and every year until 1932. Reports were made to Mr. Armstrong the water (1308) commissioner in 1919 and 1920 and to Mr. McAnelly, who succeeded him, each year. I do not know whether he reported to the State Engineer's office or not. It is the intention of the Mountain & Plains Irrigation to continue to use that water if the Supreme Court al-

lows us to, (1309) if no further opinion is handed down by the Supreme Court with reference to Bob Creek and Columbine Ditches, we would use it. We do not intend to use it if we have no right, but if we have, we intend to use it.

We operated the ditches every year and used all the water every year, we sent a man up there to shovel out the ditches (1310) and we made use of the water every year. The company itself does not own lands, but stockholders of the company own land and they use water the same as all irrigation ditches in the Poudre Valley. The individuals purchase the right to use the water from the company, and it happens that the water we have is always used. The water is diverted and stored in the reservoir and used when the preferred right holders call for it.

[fol. 862] There are a 1000 rights, each right calling for (1311) 75,000 cubic feet, and a preferred right holder has a claim to the waters from Bob Creek and Columbine.

At the time I purchased Bob Creek and Columbine Ditches in 1919 I knew that there was a lawsuit pending between Colorado and Wyoming with reference to water rights on the Laramie River, and (1312) this was known by the Mountain & Plains Irrigation at the time they purchased these properties. The opinion given me when I purchased the ditches was that the suit pending did not involve these ditches, that it was a suit between the Laramie-Poudre Tunnel and Wyoming. I did not consult Attorney Delph Carpenter with regard to the rights on Bob Creek Ditch. Our understanding from our attorneys was that (1313) we were to wait until this case was finally settled. After the State Engineer gave us orders to cease diverting water, our attorneys advised us to wait until the termination of the case. They did not say we had no right to divert the water, but they advised us to wait. If when the case is decided they give us the right to use the ditch, we will do so; if they say we cannot use it, we cannot. The instructions from the State Engineer were received by telephone on June 17, 1932.

[fol. 863] Redirect examination.

By Mr. Bryans:

(1314) The advice given the company by its attorneys was given by Paul W. Lee and George H. Shaw.

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Vol. II

TRANSCRIPT OF RECORD

Supreme Court of the United States

OCTOBER TERM, 1935

No. 10, Original

THE STATE OF WYOMING, COMPLAINANT,

vs.

THE STATE OF COLORADO.

IN EQUITY.

FILED OCTOBER 13, 1930.

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VOL. II.

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33. Letter from Charles Roach, Deputy Attorney General, State of Colorado, dated August 14, 1930, addressed to Governor Emerson, Mr. Whiting and Attorney General Wilson, and attached to it letter from Governor Adams, Mr. Hinderlider, Attorney General Winborn and Delph E. Carpenter, dated July 28, 1930, addressed to Messrs. Emerson, Whiting and Wilson	1403	1004
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36. Statement of run-off table, showing annual recorded flow of Little Laramie River at Fillmore, Wyoming, in acre feet prepared by witness Elmer K. Nelson for the years 1911-1932	1408	1007

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37. Photostatic copy of record of automatic gauge of trans-mountain diversion of water through Greeley-Poudre Tunnel from Laramie River to the Cache la Poudre River, for week of June 23-30, 1928	1409	1008
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42. Booklet of U. S. Geological Survey, Water-Supply Paper 469, "Surface Waters of Wyoming and their utilization," by Robert Follansbee (p. 206-211; 224-227) (p. 211-217)	1630	1009
43. Booklet, Supplement "B", Stream Gaging Records, Sixteenth Biennial Report of State Engineer of Wyoming, 1921-1922 (p. 116-117; 128-129; 118-122)	1869	1028
44. Booklet, Supplement "B", Stream Gaging Records, Seventeenth Biennial Report of State Engineer of Wyoming, 1923-1924 (p. 126-132; 138-139)	2036	1036
45. Booklet, Supplement "B", Stream Gaging Records, Eighteenth Biennial Report of State Engineer of Wyoming, 1925-1926 (p. 76-77; 82-83)	2153	1045
46. Booklet, Supplement "B", Stream Gaging Records, Nineteenth Biennial Report of State Engineer of Wyoming, 1927-1928 (p. 78-79)	2249	1049
47. Booklet, Supplement "B", Stream Gaging Records, Twentieth Biennial Report of State Engineer of Wyoming, 1929-1930 (p. 120-121)	2393	1051
48. Booklet, Twenty-first Biennial Report of State Engineer of Wyoming, 1931-1932, Supplement "B", Surface Waters of Wyoming (p. 53-54)	2478	1053

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49. Statement by Mr. Meeker of monthly and yearly discharge in acre feet of Laramie River at Jelm, Wyoming, compiled from records of U. S. Geological Survey, Water Supply Paper 469, and of Records Biennial Reports of State Engineers, of Colorado and Wyoming	2500	1056
50. Statement by Mr. Meeker of monthly and yearly discharges in acre feet, Laramie River near Woods, Wyoming, combined flow of Laramie River at Pioneer Dam and Pioneer Canal diversions, compiled from records of U. S. G. S. and State of Wyoming	2501	1057
51. Statement by Mr. Meeker of monthly and yearly discharge in acre feet of Little Laramie River near Filmore, Wyoming, compiled from records of U. S. G. S., W. S. Paper 469, and of Records and Biennial Reports of State Engineer of Wyoming	2502	1058
52. Statement, comparative table yearly run-off, of Laramie River at Jelm, Laramie River near Woods, Little Laramie River near Filmore, in acre feet, compiled by Mr. Meeker for years 1905, 1911-1932	2503	1059
53. Statement, comparative table, yearly run-off, of Laramie River at Jelm, Laramie River near Woods, Little Laramie River near Filmore, in acre feet, compiled by Mr. Meeker for years 1923-1932	2504	1059
54. Statement, Water Supply Laramie River Basin, showing average yearly flow and long time means and ten year means compiled by Mr. Meeker from records of U. S. G. S. and by annual reports of Colorado and Wyoming	2505	1060
55. Statement, comparative table, Water Supply, Laramie River Basin, compiled by Mr. Meeker from automatic gage charts in acre feet	2506	1060
56. Pamphlet, Instructions for Installation and tables of discharge for Improved Venturi Flume, published by State Engineer, Denver, 1930	2507	1060
57. Photograph of conditions at Venturi flume, July 11, 1929	2516	1069
58. Photostatic copy, automatic gage chart for week of July 13-20, 1929, at Venturi flume at East Portal, of Laramie-Poudre tunnel	2517	1070
59. Photostatic copy of Current Meter Notes, Engineering Department of Colorado, taken at Venturi flume, Laramie-Poudre tunnel, May 24, 1927, May 25, 1927, August 3, 1929, May 20, 1930, July 4, 1930, August 5, 1930, July, 1932, June 18, July 15, August 15, September 5, September 22, 1932, May 24, 1927	2518	1071

Complainant's exhibits:	Original	Print
60. Statement by Mr. Meeker of check current meter measurements, at Laramie-Poudre tunnel, Improved Venturi Flume at East Portal, compiled from measurements by and records of State Engineer's office, Denver, for years 1927-1932	2531	1085
61. Photostatic copy of automatic gage chart of Laramie-Poudre tunnel for week of May 1-8, 1926	2532	1087
62. Photostatic copy of original field notes of Water Commissioner for week of May 1-8, 1926. (Comparison made by witness with Exhibit 61)	2533	1088
63. Photostat, Rating Table for Wilson Supply or Sand Creek Ditch	2534	1089
64. Photostat, Daily gage height, in feet, and discharge in second feet, of Sand Creek Ditch, rating flume for year ending September 30, 1931	2535	1090
65. Photostat, Daily gage height, in feet, and discharge in second feet, of Sand Creek, or Wilson Supply Ditch, at rating flume for year ending September 30, 1932	2536	1091
66. Nine photostatic copies of automatic gage charts of State Engineer of Colorado, showing manner in which charts have been placed upon and removed from automatic register on Divide or Sand Creek Ditch for purpose of recording water diverted through Divide Ditch from Sand Creek to Sheep Creek	2537	1092
67. Two photostatic copies of official gage charts, of State Engineer of Colorado, of water diverted by Sand Creek Ditch from Sand Creek into Sheep Creek	2546	1101
68. Seven photostatic copies of automatic gage charts, from office of State Engineer, Colorado, diversions of water from Sand Creek by the Divide Ditch, during 1925	2548	1103
69. Three photostatic copies of automatic gage charts, from office of State Engineer, Colorado, measurements of water discharged by Divide Ditch from Sand Creek for year 1926	2555	1110
70. Nine photostatic copies of automatic gage charts from State Engineer's office, Colorado, diversion of water by Divide Ditch from Sand Creek for year 1927	2558	1113
71. Three photostatic copies of automatic gage charts from office of State Engineer, Colorado, diversion of water from Sand Creek by Divide Ditch, May 10-May 27, 1928	2567	1122

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72. Statement, prepared by Mr. Meeker, "Conditions of Headgates and Rating Flumes, Meadow Ditches from Laramie River and tributaries in Colorado, Water District 48," based on field trip September 16-19, 1932	2569-A	1125
73. Certified copy of Water Commissioner's Ditch Report for Irrigation Season 1927, Water District 48, showing diversions from Laramie River through Greeley-Poudre tunnel and from said river for irrigation of Meadow Lands in Colorado	2570	1127
74. Certified copy, same as No. 73, except as being for year 1928	2573	1129
75. Certified copy, same as No. 73, except as being for year 1929	2576	1131
76. Photostatic copy of P. 58-65 of booklet of Department of the Interior, U. S. G. S., "Contributions to the Hydrology of the United States" for the year 1921, by Nathan C. Grover	2579	1132
77. Topographic map of U. S. G. S., Home Quadrangle, Edition of 1920, Relief and Drainage of Headwaters of Laramie River and adjacent territory	2585	1138
78. Two photographs of West collecting canal of Laramie-Poudre tunnel, taken by Mr. Meeker in 1913	2586	1140
79. Two photographs of West collecting canal of Laramie-Poudre tunnel, taken by Mr. Meeker	2587	1141
80. Two photographs of Laramie-Poudre dam, on Laramie River, the dam being unfinshed, one looking east near West Portal, and one of water passing through conduit and through old creek bed, both taken by Mr. Meeker	2588	1142
81. Certified copy of records of District Court, Larimer County, Colorado, report of Referee, entitled "In the Matter of the Adjudication of Priorities of Water Rights in District No. 48, Colorado, for Irrigation and Other Uses"	2589	1143
82. Certified copy from District Court, Larimer County, Colorado, of testimony of Abraham I. Akin, in the matter referred to in Exhibit 81	2596	1147
83. Certified copy of Decrees of Water Rights, certified by Mr. Hinderlider, pertaining to Decree of August 7, 1891, Skyline or Laramie River Ditch, District No. 48, and Decree of August 25, 1902; also as to Lower Supply Ditch, August 25, 1902	2604	1154

Complainant's exhibits:	Original	Print
84. Certified copy of claim No. 73, Rawah and Lower Supply Ditch of Laramie River System, and of Findings and Decree of District Court of Larimer County, Case 2725, in "Matter of the Adjudication of Priorities of Water Rights in Irrigation District No. 48, of the State of Colorado for Irrigation and Other Beneficial Uses," Decree dated February 20, 1914	2608	1154
85. Certified copy of Certificates of Appropriation issued by order of the Board of Control of Wyoming, as recorded on page 236 of Order Record No. 7, entitled "In the matter of the adjudication of priorities of the right of the use of the waters of the Big Laramie River and its tributaries, being Civil Docket No. 8, Nos. 96 to 107, inclusive, in the District Court, First Judicial District, Laramie County, Wyoming," certified to by Mr. Burritt	2614	1160
86. Photostatic copy of memorandum found in files of office of State Engineer, Colorado, signed by Commissioner McAnnely of District 3, purporting to be an official record of diversion of water on August 27, 1931, from Laramie-Poudre tunnel and Lost Lake to the Cache la Poudre River	2653	1201
87. Photostatic copy of official weekly report of Commissioner of District 3, Colorado, for the week ending August 29, 1931, showing diversions of water from District 48 into District 3 and of Laramie-Poudre tunnel and Skyline Ditch	2654	1202
88. Photograph of Improved Venturi Flume at East Portal of Laramie-Poudre tunnel, July 5, 1932, taken by Mr. Parshall	2655	1203
89. Photostatic copy of check current meter measurement made July 5, 1932, at Improved Venturi Flume, East Portal-Laramie-Poudre tunnel, by Mr. Hinderlider	2656	1204
90. Copy of letter from Mr. Hinderlider, dated October 5, 1928, to Agnes Zimmerman, Home, Colorado. Attached is blue print copy of original field notes of check current meter measurement at Improved Venturi Flume, at East Portal of Laramie-Poudre tunnel, made by Bailey of State Engineer's office, Denver	2657	1205

WILLIAM J. MCANELLY, recalled for further direct examination:

By Mr. Lawrence R. Temple:

(1315) As I have already testified, I am Water Commissioner of Water District No. 3 in the State of Colorado and have held that position since 1921. Prior to that time and from 1914 to 1921, I was superintendent of The Water [fol. 864] Supply and Storage Company. The water works and system of The Water Supply and Storage Company consist of the Larimer County Ditch, which is the distributing canal, and of 10 reservoirs in the Cache la Poudre Valley and of Chambers Lake and Grand River Reservoir in the mountains, also the Skyline Ditch, diverting water from the Laramie River; the Grand River Ditch, diverting water from the Grand River or Colorado River; and the Cameron Pass Ditch, diverting water from Michigan Creek, which is a tributary of the North Platte River. The company also owns a small reservoir system consisting of Laramie and Lost Lakes on the Laramie River side above Chambers Lake. (1316) About 52,000 acres of land are irrigated under The Water Supply and Storage Company's system in Larimer and Weld Counties, Colorado. During the 7 or 8 years I was superintendent, the average use of water under the system was about 1¼ acre feet and in 1932 the diversion was about ¾ of an acre foot. In an average year it is necessary to operate all of the works of the company to full capacity in order to deliver a fair amount of water for irrigation (1317) of the crops under the system. The crops raised under the system mentioned consist of grain, hay, alfalfa, sugar beet, potatoes, cabbage, onions, beans and some peas for canning. The season for the irrigation of those crops will average from about the 1st of May to about the 12th of September each year. The foremen of the various trans-mountain diversions of The Water Supply and Storage Company are responsible to me for the delivery of the amount of water reported from the various trans-mountain diversions, and my supervision of those foremen ends with the delivery of that water. All of the gauge readers or foremen at the trans-mountain ditches of The Water Supply and Storage Company report to me through the caretaker at Chambers Lake, which is the central point of distributions (1318) of the company's moun-

tain system. The care-taker at Chambers Lake reports to [fol. 865] me each 24 hours as to all trans-mountain diversions during the preceding 24 hours, and I in turn report to the State Engineer of Colorado once each week.

The Water Supply and Storage Company is the key system in the exchange used in the Cache la Poudre Valley and which I have heretofore explained. This is on account of the fact that all of the trans-mountain diversions of the company may be used in (1319) the exchange system. The par value of the stock of The Water Supply and Storage Company is $100.00 per share, and the reasonable market price and value of that stock is between $5,000.00 and $6,000.00 per share. This value is larger on account of the supplemental supply which has been necessary to obtain from the trans-mountain sources. The farms under the system are highly productive and in a very high state of cultivation, and water is absolutely necessary to raise crops on these lands. The company is a strictly mutual company and each share of stock represents 1/600 part of all of the water available for use under the system. The average annual cost for (1320) maintenance and for retiring the bonded indebtedness is about $3.00 per acre, of which approximately one-half is for maintenance and improvements. Very much the larger part of the maintenance expense is in the mountain system.

With reference to a diversion through the Laramie-Poudre Tunnel in 1926 of water which was thereafter delivered in the Laramie County Ditch of The Water Supply and Storage Company, amounting to about 490 acre feet, which is said to be an unreported diversion from the Skyline Ditch, my records disclose that all of that water was charged to the Laramie-Poudre Tunnel in my computation. I do not recall the specific circumstances, but if any water was delivered through the Tunnel, it was subject to delivery on this side in District No. 3 at any point it may have been ordered.

With reference to testimony for the plaintiff that during [fol. 866] the week of June 19th to 26th, 1926, an average flow of 99 second feet (1321) through the Skyline Ditch was unreported by me as Water Commissioner when the automatic register sheets showed continuous diversion for that week, I will state that as I recall the year 1926 was one of a very heavy flow of water both on the Cache la Poudre

side and in the Laramie River and that water was coming so fast on the Laramie side that it was impossible to keep it out of the ditch. The company had endeavored to shut the water off and made no daily report of any diversion, and it was not reported until the sheets came in, and in turn they were sent to the State Engineer. Whatever water came through the Skyline Ditch which was not reported on my weekly reports was mingled with the general waters of the Poudre River and no benefit was derived by The Water Supply and Storage Company from any water that I did not report in my weekly report. The storage capacity of Chambers Lake in 1926 was 41 feet above the bottom of the outlet tube, and if the record shows that at the time (1322) mentioned there was 45 feet stored in Chambers Lake, it would not have been possible for The Water Supply and Storage Company to receive any benefit from that additional storage.

Cross-examination.

By Mr. James A. Greenwood:

Any unreported water during the week of June 19th, 1926, from the Skyline Ditch would have been available for use in the drainage of the South Platte, and I think most of that water went directly through the Poudre River into the South Platte River. The Water Supply and Storage Company could not have gotten the benefit from it for the reason they could not make demand for more than they might divert through the Larimer County Ditch, and in no event could they receive more Laramie River water at any time than the records show were delivered into the Cachela Poudre.

[fol. 867] (1323) BURGIS G. COY, witness recalled in behalf of defendant:

Redirect examination.

By Mr. Wm. A. Bryans:

I am familiar with Bob Creek and Columbine Ditches. I was not at the Columbine Ditch in 1920, but was there June 9, 1921.

I went up to Bob Creek Ditch June 11, 1920, to rate a flume that had been built to divert water. The rating flume that had been in had washed out, or rotted out, and it was necessary to replace it. A new flume was (1324) built in 1920. I took a rating from the flume June 11, 1920.

I have a table here showing the ratings for each one-tenth of a foot in depth; one second foot; two-tenths, 2.4 second feet; three-tenths, 3.9 second feet; four-tenths, 6 feet; five-tenths, 8.7; six-tenths, 12 feet; seven-tenths, 16 feet; eight-tenths, 21.3 feet; nine-tenths, 24.5 feet; one foot, 28 feet; 1.1, 31.7 feet; 1.2, 35.6 feet; 1.3, 39.7 feet. That is as far as I could carry it out on that day. The peak then, was 39.7. That was about noon, or a little after noon.

I took ratings on the Columbine Ditch, June 9, 1921, as follows: for one-tenth of a foot, 1.1 second feet; two-tenths, 2.3 second feet; three-tenths, 3.5 second feet; four-tenths, 4.75 second feet; five-tenths, 6.1 feet; six-tenths, 7.6 feet; seven-tenths, 9.25 feet; eight-tenths, 11.1 foot; nine-tenths, 13.06 feet; one foot, 15.2 feet; 1.1 foot, 17.55 feet; 1.2, 21.10; 1.3, 25 feet; 1.4, 26.25; 1½ feet, 29.95. That is as far as we carried that rating.

(1325) I didn't make any measurement of the capacity of these ditches. I would estimate Bob Creek would carry 50-60 second feet; Columbine, probably 40 feet.

[fol. 868] J. E. JOHNS:

Direct examination.

By Mr. Wm. A. Bryans:

I live in Fort Collins and have lived there for 31 years. I was first employed by the Mountain and Plains Irrigation (1326) Company in 1919, fixing up ditches. I was superintendent of Columbine and Bob Creek ditches. The ditches were about three miles apart. I went up there in August, 1919, the first time, three or four men went with me. When I first saw Bob Creek Ditch in 1919, there were three or four breaks in the ditch and a lot of dirt and mud at the upper end of the cut. (1327) We built two or three cabins in addition to the cabins there. The flume was in good shape, it carried water for two years that I know of.

There were two or three breaks in Columbine Ditch, there was no flume there. There were cabins there, too.

From my observation I would say they had run water in both ditches prior to 1919. The water usually starts about the middle of May, the peak is about the first of June, and it reaches its (1328) peak about the 5th or 6th of June, and it will run until into July.

I was at the ditches in 1920, 1921, 1922, was up there three years, and was employed as superintendent of the ditches in charge of the works. I was supposed to fix the breaks, build cabins, and shovel snow out of the ditches.

There was only a small amount of water in the ditches in 1919 after we got the breaks fixed. I was there in 1920 and 1921 when Mr. Coy was up there. I took daily readings and sent them down to (1329) Mr. Portner, the president of the Mountain & Plains Irrigation Company. These readings were based on the ratings compiled by Mr. Coy. I sent my reports in every week. Automatic gauges were installed in 1920 on Bob Creek. Water was first run in the Columbine Ditch in 1921.

[fol. 869] Roy A. Portner:

Redirect examination.

By Mr. Wm. A. Bryans:

(1330) There were automatic registers on the weirs that we installed in 1920 on Bob Creek and Columbine ditches, and we have continued them in use at all times when we ran water.

[fol. 870] Recross-examination.

By Mr. James A. Greenwood:

(1331) I was advised by Mr. Lee and Mr. Shaw as to the legal status of my claim of Bob Creek Ditch. Mr. Lee was my attorney at the time the company was incorporated and Mr. Lee had one share of stock to make up the corporation. Mr. Shaw formerly owned them, but Mr. Schureman and I own all of them except one share owned by Mr. Bryans as a qualifying share for director of the company.

[fol. 871] FRED W. STOVER:

Redirect examination.

By Mr. Wm. A. Bryans:

(1331) I am an attorney at law practicing in Fort Collins, and have been appointed referee by the District Court of Larimer County in Water District No. 48. I was appointed on August 8, 1929 and qualified on the same date.

John McNabb testified on November 19, 1929, and a little in rebuttal on February 11, 1930, under the statement of claim of the Mountain & Plains Irrigation Company. John McNabb is now dead.

(1332) I have not filed my report with the court yet. I am not sure whether there is further testimony to be taken. The suit of Wyoming v. Colorado in the United States Supreme Court seems to have something to do with the delay in this pending adjudication (1333) as we have tried to set a date satisfactory to all attorneys interested, and have been informed that they did not care to proceed at the present time.

[fol. 872] ROY A. PORTNER, witness in behalf of defendant:

Direct examination.

By Mr. Wm. A. Bryans:

(1334) I wish to correct my testimony previously given as to the capacity of Bob Creek Ditch and Columbine Ditch. Bob Creek Ditch produces from 1750 to 1775 acre feet instead of 2350 acre feet. The Columbine Ditch produces from 550 to 575, instead of 800. When I said 2350 acre feet, I meant for the two ditches.

[fol. 873] Mr. Bryans: That is all.

(And thereupon, papers were marked for identification, Defendant's Exhibits Y, Z, A-1, B-1 and C-1.)

Mr. Bryans: We now offer in evidence Defendant's Exhibits Y to C-1, inclusive, Defendant's Exhibit Y being a quit claim deed from the Divide Canal and Reservoir Company, and Bruce G. Eaton, as executor of the will of Ben-

jamin H. Eaton, to Roy Portner; Defendant's Exhibit A-1 being a certified copy of statement of claim of the Bob Creek Ditch; Defendant's Exhibit Z being a certified copy of statement of claim of the (1335) Bob Creek Extension; Defendant's Exhibit B-1 being a statement of claim of the Columbine Extension; and Defendant's Exhibit G-1 being a statement of claim of the Columbine Ditch.

[fol. 874] E. J. GREGORY, witness in behalf of defendant.

Direct examination.

By Mr. Wm. A. Bryans:

I have lived in Larimer County not continuously for 40 years but much of the time.

When I first came to Colorado I was employed as (1336) resident engineer and superintendent of the North Poudre Irrigation Company. I was familiar with Bob Creek Ditch in its various stages. I made the first survey, the preliminary survey, began it September 22, 1897. Philip Wilson accompanied me, and he later filed a statement of claim to Bob Creek Ditch. I had a financial interest in the ditch with Philip Wilson and made the survey at his request. I disposed of my interest later for a money consideration, but I cannot state the date.

I ran the levels so that I could make a plat of (1337) the ditch. There were stakes driven. I was not present at the time of the construction of the ditch. I cannot say for sure that I have ever returned to the ditch since I made the survey, but I believe I was there once afterwards.

[fol. 875] MOLLIE GREENWALD, witness in behalf of defendant:

Direct examination.

By Mr. Wm. A. Bryans:

I am the reporter who took the testimony in the proceeding known as "In the Matter of the Adjudication of Priority (1338) of Water Rights in Adjudication District

No. 48 in the State of Colorado, for Irrigation and Other Beneficial Uses." I made a transcript of it. There was a witness by the name of John McNabb who testified in that proceeding. He is now deceased. Before testifying, Mr. McNabb was sworn by the referee to testify as to the truth and nothing but the truth. I have my notes taken at that time which I have transcribed. Defendant's Exhibit D-1 is a transcript of John McNabb's testimony (1339) taken November 19, 1929, and is a true and correct copy of my original transcript of testimony.

Thereupon Defendant's Exhibt D-1 was offered in evidence.

[fol. 876] W. R. Burns, witness in behalf of defendant:

Direct examination.

By Mr. Wm. A. Bryans:

I live in Fort Collins and have lived there about 25 years. I have been in the employ of the Mountain & Plains Irrigation Company and worked on the Bob Creek and Columbine Ditches. I was first employed on these ditches in 1920 and worked on them also in 1921, 1922, 1924 and 1925. I hauled provisions and shoveled snow, helped to clean the ditches. Water was run in both ditches in the year 1920 and every year that I worked for the company. The ditches were of sufficient capacity to carry all of the water (1340) that was available, except sometimes the snow would clog the ditches and we would have to clear them out. I think that all of the water available was turned into the ditches.

(1341) Mr. Bryans reads into the record that part of the findings "In the Matter of the Adjudication of Priority of Right to Use of Water for Irrigation in Water District No. 48, State of Colorado," being defendant's Exhibit G, and case No. 1335, that part of said findings referred to therein as No. 36, Sand Creek Ditch System, appearing on page 7 of said exhibit.

Also reads into the record that part of the decree in the above referred to adjudication appearing on page 33 of (1342) defendant's Exhibit G.

(1343) No cross-examination.

[fol. 877] A. A. EDWARDS, witness in behalf of defendant:

Direct examination.

By Mr. Lawrence R. Temple:

(1344) I reside in Fort Collins, Colorado, and have lived in this community from 1869 to 1870, when I returned to my home in Pennsylvania and later returned, in 1876, to Fort Collins and have lived here ever since.

I am the same A. A. Edwards who testified in the former suit between the States of Wyoming and Colorado. Since living in Fort Collins I have been engaged in several different lines, but most of the time in the irrigation business. I was formerly connected with the Water Supply and Storage Company which commenced in July, 1891, and continued until January, 1910.

(1345) I was a member of the first Board of Directors and Secretary from the time the company was incorporated until the spring of 1895, when I was elected President and continued in that position until January, 1910. At the time the Water Supply and Storage Company organized in 1891, it acquired all the properties formerly owned by the Larimer County Ditch Company, including the Laramie County Ditch, Chambers Lake, reservoirs 1 to 5 inclusive and Lindemeir Lake and also Lost and Laramie Lakes. The company's first diversion was in Cameron Pass, a small tributary of the Michigan River and in July, 1891, started construction of the Laramie River Ditch and that is what is now commonly known as the Skyline Ditch. During the year 1891 we constructed about one quarter of a mile in length at the lower end of what is known as the Skyline Ditch, and the following year, 1892, the contract was let to Carlisle and Weitbree and they finished the construction of the whole [fol. 878] system about July, 1894, when water was turned through the whole (1346) length of the Skyline Ditch for the first time.

My recollection is that it is about 9200 feet and the altitude at the West branch would be something like about 9300 feet. The Larimer County Ditch Company had put in a fill across the outlet of those lakes belonging to the Lost Lake system and diverted the water into Chambers Lake before the Water Supply and Storage Company was organized,

and the water from the Skyline Ditch as well as the water from the Lost and Laramie Lakes was taken into and through Chambers Lake and down through the Poudre River.

The water was diverted at the headgate of the Larimer County Ditch some seven or eight miles northwest of Fort Collins and carried out through that system a total distance of about seventy miles, through Larimer into Weld County, and I think in 1910 when I left the Company, that there was irrigated about 35,000 or 40,000 acres of land. The Water Supply and Storage Company was a mutual company, the capital stock being $60,000 at $100 par value and the ownership consisted of one water right in the old company, and entitled that owner to subscribe for one share of stock in the new Company.

(1347) The ownership of the stock in the Water Supply and Storage Company continued practically the same way as to those who formerly owned the rights in the Larimer County Ditch.

From the time of the completion of the Skyline Ditch in 1894, our company each year during my connection with it diverted water from the headwaters of the Laramie River [fol. 879] into the Poudre, to the full capacity of the ditch and that was a continuous operation which occurred each season up to the amount that was available for diversion. All the water that we diverted through the Skyline Ditch was necessary for the irrigation of the lands lying under the system.

(1348) The Larimer County Ditch Company had a decree, number 100, on the Cache la Poudre River for 463 cubic feet per second, but that was in Water District No. 3, and the chance to obtain water under that decree was not very certain, so the company officials began to look for water elsewhere. The average time in which we could get our direct decree in the Cache la Poudre River, filled was during the usual flood period in June and it did not average over three years out of five that we could get anything on that decree. During the years that I was President and Manager of the System, we diverted through the ditch almost all the time the full flow of those branches. The West branch and the others and that continued during the entire season when the water was flowing in those streams.

The cost or the expense of the construction of the Skyline Ditch was $80,000.00 and the most of the money to pay that

cost was raised by a bond issue for $60,000, on all the properties of the Company which was paid afterwards by assessments on the capital stock. The owners of the ditch company through assessment paid the entire cost of construction, although I do not believe it was all paid at the time I severed my connection with the Company.

Mr. Greenwood: No cress-examination.

[fols. 880 & 881] R. J. Tipton, witness recalled by defendant for further direct examination:

(Defendant's Exhibit E-1 marked for identification.)

(1349) Defendant's Exhibit E-1 is a rating curve for the Parshall six foot flume, which is installed at the outlet of the Laramie-Poudre Tunnel and consists of a graph. On the left hand side of the graph is a scale marked "Gage Height (Fee)." and runs from zero to four feet. Each one of the heavier lines represents one-tenth of a foot in depth. On the lower side of the graph is a scale which reads "Discharge (Second (1350) Feet)." This scale runs from zero on the left to 250 second feet on the right. Each major division represents 10 second feet and each smaller division represents 1 second foot. The heavier curve line, which is labeled "Curve based on Parshall flume tables," represents the theoretical curve which they have determined to give the discharge for the six-foot Parshall flume. Along the curve appear several dots, 24 in all, which represent the results of all meter measurements that have been made of the discharge of the Parshall flume at the outlet of the Tunnel. Each point is numbered from 1 to 24. On the right side of the exhibit appears a table on which are listed all of the measurements that have been made of the discharge of the Tunnel at the flume. The second column of the table gives the date the measurement was made. The third column gives the gage height at the time the measurement was made. The fourth column the discharge as determined by the current meter measurement and the fifth column gives (1351) the name of the hydrographer who made the measurement.

The exhibit was prepared under my supervision.

(Defendant's Exhibit F-1, marked for identification.)

Note: Exhibit "E-1" was offered at page 1489.

Defendant's Exhibit "E-1" omitted. Printed side page 3054 post.

[fol. 882] Defendant's Exhibit F-1 is the current Meter Notes of a discharge measurement made at the Parshall flume at the outlet of the Laramie River Poudre Tunnel on July 18, 1929, by J. H. Bailey, then chief hydrographer with the State Engineer of Colorado.

(Defendant's Exhibit F-1 is offered in evidence.)

(Defendant's Exhibit G-1, marked for identification.)

[fol. 883] Defendant's Exhibit G-1 is a copy of the meter measurement notes made by J. H. Bailey, Chief hydrographer of the State Engineer's Office, and which notes are in connection with the measurement which Mr. Bailey made of the discharge at the Parshall flume at the outlet of the Laramie-Poudre Tunnel on July 18, 1929. This measurement was made on the same day as the notes which appear in Defendant's Exhibit F-1 were made and is also an official record of the Engineer's office of the State of Colorado.

(Defendant's Exhibit G-1 is offered in evidence.)

[fol. 884] RALPH L. PARSHALL, witness in behalf of defendant:

Direct examination.

By Mr. Shrader P. Howell:

(1352) I am a resident of Fort Collins, Colorado, where I have resided for the past 33 years. I am an irrigation engineer and at the present time I am Senior Irrigation Engineer of the Bureau of Agricultural Engineering, United States Department of Agriculture, located at Fort Collins, Colorado, with which (1353) the Colorado Experiment Station is connected. I have been connected with that work since 1913, and in which I worked *somce* 1918. In June, 1904, I graduated from the Colorado Agricultural College, receiving a degree of B. S. in Civil Engineering and Irrigation. Following that, and until 1913, I was em-

ployed as Instructor and Assistant Professor in Civil and Irrigation Engineering with the State Agricultural College. I then resigned to accept a position with the United States Department of Agricultural and the Colorado Experiment Station, and as above stated I was made head of the investigation work in 1918, and have continued in that capacity to this (1354) date. The work carried on with the Colorado Experimental Station has to do with the investigation of problems relating to irrigation and is largely confined to laboratory work in the perfection of measuring devices, and other hydraulic problems. This laboratory is designed primarily for the investigation and perfection of means of improving general practice in measuring flowing water in the field. We made complete analyses of weirs of various types, and investigated such devices as orifices, and the Australian method of measuring water known as the Dethridge. Perhaps one of the outstanding pieces of work that has been accomplished is the developing of what is being [fol. 885] called the Parshall Measuring Flume. We have also investigated the current meter, where it is used under practical conditions.

(1355) We have almost constantly engaged in the study of these various water measuring devices for a period of twenty years.

In answer to your question, I may say that I am an associate member of the American Society of Civil Engineers and have been a member of a Special Committee appointed by the Board of Directors of that Society, known as the Special Committee on Irrigation Hydraulics. The Committee is concerned primarily with subjects pertaining to hydraulics, as applied (1356) to irrigation. There are various methods used in determining the discharge in the channel, but the general practice is by the use of what is called the current meter. This meter is carefully calibrated in the laboratory and from the data there gathered it is possible to establish what we call a rating curve showing the revolutions per second for a definite speed in feet per second.

(1357) In measuring the stream flow the metal is held stationary, and the water as it passes by causes the turbine to rotate, and knowing the rotation of the meter, we

then determine the speed or velocity of the moving water. The discharge in any section is taken as the ve*ol*city, times the area of the section and in this current meter measurement the instrument gives you the velocity of the water, and by depth measurements it is possible to determine the area of the cross section, and the product then is the rate of discharge in cubic feet per second. There are other methods that may be used, which would depend upon (1358) the particular conditions existing. If the canal is provided [fol. 886] with what we call — water stage recording instrument, it is possible to obtain a record of the continuous discharge of the particular canal under investigation. The rating flume is a simple device that has been used in irrigation practice, and consists generally of a section of the channel where the structure has a level floor, and the walls may be either vertical or inclined, which is for the purpose of definitely defining the section or area of the water prism. The staff gage is a graduated scale fixed to the wall of the channel, (1359) or the flume, in a vertical position graduated in feet or tenths of feet. In order to calibrate this structure, it is necessary to observe the various discharges through the full capacity of the channel, and note on this staff gage the depth of the water for that particular discharge, and from this data a curve may be established known as the discharge curve, and sometimes referred to as the rating curve. The stilling-well erected alongside the rating flume is the means used for quieting down or making less fluctuations in the record, because of the stilling effect of the water in the well.

I am familiar with the Bristol gage, which has a chart in circular form, on which the depth is recorded, as increasing (1360) radius and the time is recorded circumferentially. In this case, the timing gage mechanism moves the chart, and the variation is communicated by a float which actuates the pen or stylus. The Bristol recording device is considered standard equipment.

(1361) I could scarcely say that the measurement of water under field conditions is considered by irrigation engineers as an exact science, if we refer to the measuring device known as the rating flume. My experience over 20 years with the rating flume indicates that its correctness is affected by accumulations of sand on the bed of the channel [fol. 887] and the encroachment of the channel of growth

of weeds, willows, and such things which materially interfere with the discharge as indicated by the staff gage reading. In other words, the particular conditions where the measurement is taken would have some influence upon determining the accuracy of the stream (1362) flow for a particular channel. It has been the purpose of our laboratory work for the past fifteen years to develop a dependable and satisfactory device for the flow of water in open channels, and the result of that work has been the Venturi or Parshall flume.

(1363) I have attempted to make it plain that the original idea of the contracted section is not original with me. I make no claim at all to that. The only thing is that I have been able to propose a different design and I believe that I have been more or less successful in being able to get a rather larger use of this structure under practical field conditions. As a result of the approval of the findings of this committee of the American Society of Civil Engineers, the flume is (1364) designated as the Venturi or Parshall flume.

As previously indicated the rectangular rating flume is affected by the disturbed natural conditions in the channel itself, such as the scouring out of the sand, or the filling in, and various other reasons, so that the depth of water is changed, yet the rate of flow might be constant. In the Parshall measuring flume we find that though the depth downstream might change to rather wide limits, yet that did not affect the intended rate of discharge of the canal.

(1365) The Parshall measuring flume has an approach section which is converging and is on a slope of 1 to 5. The walls are vertical, and the floor is level. At the down-[fol. 888] stream end of this converging section is a throat section, the length of this varying according to the size of the structure. The floor of the throat section is inclined downward in the direction of the flow, having a drop of 9 inches vertically to 24 inches horizontally. Down-stream from the throat section is an expanding or diverging section where the divergence is on a ratio of one to six, and the floor is inclined upward on a ratio of one to six. This leaves the lower edge, the downstream edge of the floor or structure, three inches lower in elevation than the down-stream edge of the floor of the converging section. The

control point is the throat of the flume, and the velocity through the throat is ordinarily relatively high.

(1366) It is difficult to state just how many Parshall flumes have been installed, but I have recently estimated that there are probably 2500 such flumes in use in Colorado alone, these varying in size from the throat width of three inches to one having a throat width of 40 feet. Besides, they are being used in various parts of the Western states in connection with irrigation and several hundred of them are in use in the Hawaiian Islands in connection with the irrigation system on the sugar plantations. They are also used in South Africa and in the Argentine Republic; in Honduras and Peru, British Columbia, and just this week we received a letter from an engineer at Moscow, Russia, who was very much interested in this type of measuring device.

I supervised in a general way the installation of the Parshall flume at the head of the Laramie-Poudre Tunnel. I prepared the plans for it and inspected the conditions existing before the structure was built and inspected it [fol. 889] after the structure was in commission, but I was not there during the time it was being installed. My diary indicates that I prepared the drawings during the last week of April, 1927, and I imagine it was built during the last few days of April or May, 1927. I think previous to my being asked to assist in the problem involved at the Laramie-Poudre Tunnel an attempt had been made to use a concrete channel as an ordinary rating flume; apparently it was not at all satisfactory. (1367) I proposed building a six foot Parshall measuring flume, such that the converging section of the structure would be built inside the concrete flume, and the throat and diverting section would be built at the outside or end of this old concrete flume and it was so built as I suggested. The concrete structure has a channel about 10 or 11 feet wide and 40 to 50 feet long; and is used to divert the water from the outlet, or mouth of the Tunnel, as it comes from the Laramie River. The down-stream side of this concrete flume is more or less a retaining wall, the axis being about at right angles to the axis of the Tunnel, so that it is necessary for the water to turn after it leaves the tunnel into this concrete flume, at the end of which is placed the new measuring device.

(1368) I have observed gravel deposits in the flume upstream from the float but have never found anything in the lower portion of the converging section, nor in the throat of the flume itself. In my opinion gravel or other debris that might be brought to the flume by the water, could not lodge in the throat because of the excessive velocities. In my opinion, ordinarily, I would say that the accumulation of gravel at the entrance of the flume above the throat would not have a great affect upon the flow of the water [fol. 890] through the throat, yet there may be cases where it might interfere, but just to what extent that would be I am unable to state.

We have conducted various experiments in the laboratory in an attempt to determine the effect of debris upon the measurement of water that passed through the throat of the flume under somewhat similar physical conditions to those found at the outlet of the Laramie-Poudre Tunnel, and from such experimental data as we have on such a condition, there might be times where large stones are moved in, and if they (1369) were uniformly distributed across one end of the flume, where the water is flowing over, I doubt if there would be a very great effect on the rate of discharge. The water is controlled by the throat section, and the water flows under what we call a critical condition; that is, the water will assume a fixed minimum depth for a certain rate of discharge that is (1370) in the throat. So, ordinarily, I would say, that unless the obstructions were very excessive, the indicated rate of flow would not be materially changed.

Our experience with current meter measurements has been that you have to be very careful in the selection of the section of the stream or canal in which you are going to make your gaging, and also your experience teaches the proper method to use under the particular condition existing. We have found that the current meter is a very reliable instrument, providing it is used under proper conditions; but you cannot take a current meter and simply go out in any section and measure the discharge accurately, because it is physically impossible.

(1371) In my opinion there may be times when the accumulation of gravel at the entrance is such that a good current meter measurement could not be made yet the flow [fol. 891] through the throat of the flume would be uni-

formly regular, and the flume would be measuring the flow of the water within practical limits of accuracy.

(Defendant's Exhibit H-1, marked for identification.)

[fol. 892] This is a table showing the results of the current meter gagings made on a six-foot Parshall Measuring Flume at the East Portal of the Laramie-Poudre Tunnel. The table shows the dates in the first column on which these measurements were made; the H, sub a, gage on the flume head is in feet; the computed rate of discharge in second feet, as determined by the equation of this particular size flume; the current meter discharge in second feet; the difference between the computed and observed discharge; the deviation in percent and the name of the hydrographer. The names appearing on this exhibit of the hydrographers are Rohwer and (1372) Parshall. Mr. Rohwer is my assistant in our work at the Experiment Station. I was not present when the measurements indicated on this exhibit were taken by Mr. Rohwer, with the exception of that on October 3, 1928. Of the eight measurements shown on this exhibit I individually made five of them and Mr. Rohwer and myself made two others. The third one being by Mr. Rohwer and my son. The measurements made in 1927, 1928 and 1930 were made under fair to good conditions. The two measurements that I made in July, 1932, were under unsatisfactory conditions. With reference to the measurement made by myself and Mr. Rohwer on June 16, 1927, we determined by means of an engineer's level and rod, the relative levels (1373) of the grades and the floor of the converging section, and the zero of the staff gage which had been established prior to that time. Later, we made the current meter gaging, which seems to indicate quite close agreement between the discharge, being seven-tenths of one per cent. in deviation. We found, as I recall, an error in the gage installation to the amount of a difference of 16/100ths of a foot, and we made a correction accord-[fol. 893] ingly.

(Defendant's Exhibit I-1 marked for identification.)

[fol. 894] This is a Bristol Recording Water Level Gage chart, covering the period from June 11, 1927, to June 18, 1927, which was taken from the recording device installed on the Laramie-Poudre Tunnel. I observe a notation made

on the chart in pencil for June 16, 1927, which is in my handwriting, and which reads "Gage corrected .16' by Parshall," and the arrow (1374) in pencil points to the place on the graph where the correction is shown.

Referring to the automatic register chart it will be noted that to the right of the point where the notation was made the gage indicates a stage of about 1.22 or 3. To the left of this abrupt change, the gage indicates the depth of about 1.03, or 4, showing a change of approximately .16 of a foot. At the time I observed the chart I corrected the pen, to conform with the arrow, and that correction as to the position of the pen explains the abrupt deviation of the record made by the pen gage on the chart.

The flume was installed in about May of 1927, and from that time until June 16, 1927, the automatic recording device was recording a gage height that was .16 of a foot above the proper gage height; the reasons for which error I have heretofore detailed. Ordinarily, and particularly in wooden (1375) structures, there is a tendency for more or less swelling of the wood until it finally settles to a fixed position, and a new recording device ordinarily requires a little time to make the necessary adjustments so that it will operate correctly. I don't know who determined the first setting of the instrument on the Laramie-Poudre Tunnel, but when we came along on the 16th day of June, we discovered his error. This was approximately about a month after the instrument had been installed. It would [fol. 895] be entirely possible for an engineer to determine the true gage height at any time prior to June 16, 1927, from the charts prior to that date in connection with the correction which appears on the chart under date of June 16, 1927, because it was indicated on the chart (1376) that up to June 16, 1927, the device showed a gage height of .16 in excess of the true gage height. It would only be necessary to go back and correct the error in the previous record. Such a procedure of making correction of an error as it appears on the automatic chart which has been carried forward for sometime is not at all unusual in the interpretation of such charts.

(Defendant's Exhibit I-1, offered in evidence.)

Complainant's Exhibit No. 60 purports to show the results of certain current meter measurements made by the State Engineer's office, as against the discharge of the Par-

shall flume at the outlet of the Laramie-Poudre Tunnel, is a comparison made on the basis of the chart gage as shown in column 2 of the Exhibit, rather than on the basis of the staff gage reading at the time the measurements were made. The first three measurements were made by Mr. M. C. Hinderlider on May 24th and 25th, 1927, prior to the time that Mr. Rohwer and myself found the error of .16 of a foot in the staff (1377) gage setting on June 16, 1927. The gage height, as indicated in column 4, when Mr. Hinderlider made his measurements on May 24, 1927, is 1.08, and when this indicated gage height is corrected for the .16 of a foot error that we found existed in the staff gage setting, the true gage reading becomes .92. The corrected gage should be .92. The record, therefore, in column 5 shows a discharge of 20.51, and the computed discharge would be 21.01 second feet. Mr. Hinderlider's second measurement shows a dis- [fol. 896] charge of 20.98 second feet; computed discharge of 21.01, which would be a deviation of .03 of a second foot. When I speak of "computed discharge", I mean computed from the table. The deviation in per cent between this quantity and the discharge as measured by Mr. Hinderlider for the first measurement would be about 2-1/2%, and the deviation on the second measurement would be approximately 1 10th of 1%.

(1378) Exhibit 60 also indicates that Mr. Hinderlider measured the flow of water and found a discharge of 8.35 second feet, and that the automatic register chart showed a gage height of .68 feet at the time of that measurement. Making the correction in view of the .16 foot error, which Mr. Rohwer and myself found in the staff gage setting on June 16, 1927, that would show a corrected gage height of .52 of a foot and the computed (1379) discharge would be 8.46. And the deviation in per cent between this quantity and the discharge, as measured by Mr. Hinderlider would probably be 1.6 or 1.7 per cent, and I think it is a practical check of these three measurements. The mean deviation between the measurements would be possibly 1½%, which is well within the practical limits. Of course, the percentage of error indicated in Exhibit 60, as 32, 29 and 56, respectively, is obviously in error.

In my opinion Mr. R. I. Meeker, who prepared Exhibit 60, or any other engineer who had access to the automatic register charts of the Tunnel in 1927, could have determined

that a true gage height on May 24, 1927, was .92 feet instead of 1.08 feet, as the exhibit shows, and that the true gage height on May 25th was .52 instead of .68, as the exhibit shows.

(1380) I was present also at the time Mr. Hinderlider and Mr. John E. Field made measurements on this flume of the flow of water through the tunnel, which I think was on July 5, 1932. I think the complainant's Exhibit No. 59, on page [fol. 897] 6, shows the meter notes of one of the measurements made by Mr. Hinderlider, who, as I recall, observed the velocity measurement and Mr. John E. Field assisted in determining the depth, and I was acting as the recorder. As I recall the conditions, which obtained at the time those measurements were made, were poor (1381) from the standpoint of measuring the discharge by means of the current meter; that is to say, the rating section was poor, as evidenced by the velocities ranging from 4.2 feet on one side to only .7 on the opposite side. There was no deposit in the throat of the flume, but there was some at the upper end or the converging section, and while the flow through the throat was fairly uniform, I personally made a measurement again on July 10, 1932, and the result of that measurement is shown on defendant's Exhibit H-1. So far as I could see the conditions existing in the flume on July 10, 1932, were substantially the same as those found on July 5th, 1932, when the measurements were made by Mr. Hinderlider and Mr. Field.

(1382) It appears that my measurements made on July 5th, 1932, showed a deviation of 15.7% and this section was taken approximately at the same place that was used by Mr. Hinderlider and Mr. Field, on July 10, 1932. My measurement was of a section three or four feet upstream from the crest where the velocities were more uniformly distributed. This measurement shows a deviation of 6½% and I contribute this deviation largely to the fact that I was not able to determine the area of the section, because of the roughness of the water and also of the high velocities pertaining at that point. I would say, generally, that both my measurements taken on the 5th and 10th are questionable. Of the two measurements possibly the latter is somewhat more accurate because we had there less variation in the velocity (1383) and distribution. Even in such circumstances the measurement of the water coming through the

throat of the flume might have been registering a proper discharge, and I think it would have the tendency to register within practical limits, even though it was unsuitable for [fol. 898] current meter measurement.

Defendant's Exhibit F-1, purports to contain meter notes of J. H. Baily, when he measured the flow of the water through the Tunnel Flume on July 19, 1929, and this tabulation indicates that the gage height was .9 of a foot at the beginning, and at the end it had reduced to .78 or a drop of .12 of a foot. (1384) We have found in our attempts to make check measurements on this type of a device with the current meter, that it is very uncertain just what the correction should be for a dropping head. Both factors, area of the cross section, and the velocity, are affected either by a rise or fall in the stage, and we have found that if it deviates as much as these would indicate, we would not consider it as a fair check measurement.

Defendant's Exhibit G-1, which contains the meter notes made by Mr. J. H. Baily, when he made his second measure of the flow through the flume on July 19, 1929, shows the gage height to be .75 foot at the beginning and .73 foot at the end, or a drop of .02 of a foot, which we would consider within practical limits of variation of stage during the gaging, that is .02 of a foot. This would indicate in the drop of .12 a deviation between the computed and observed discharge of 4½ second feet, whereas in the latter case, with a drop of .02 of a foot, the deviation is .51 of a second foot, and I would consider the (1385) latter measurement more accurate.

Defendant's Exhibit E-1, showing the rating curve for the Parshall Flume of the Laramie River Tunnel, covers measurements that were made by myself and Mr. Rohwer. There are 24 indicated measurements on the Exhibit, of which 8 were made by Mr. Rohwer and myself making about one-third, which are numbered 5, 6, 11, 17, 20, 21 and 24. The serial number of the measurement which I made on July 5, 1932, is number 21 and those made by Mr. Hinderlider and [fol. 899] Mr. Field and myself are numbered 18 and 19. The first measurement made by Mr. Baily on July 18, 1929, is number 12.

For the reasons heretofore indicated that the conditions were not conducive to measuring the flow accurately with the current meter, when the measurements 12, 18, 19 and 21,

were made, I would say that the rating curve, referring to (1386) Defendant's Exhibit E-1 is very good. I would criticize, however, these points 12, 18, 19 and 21 since number 12 was observed under a falling head. Eighteen and 19 made by Mr. Hinderlider, Mr. Field and myself were observed under the condition which is not conducive to accurate meter measurements, and my own measurement number 21 was at or near the crest of the flume where the velocities were high and it was not possible to accurately determine the area of the section. From a further analysis that I have made of the operation of this particular flume from my own records, I am of the opinion that it is rather remarkable that this curve as established in our laboratory holds so closely to the measurements that were taken in the field, nowithstanding the suspicion which points 12, 18, 19 and 21 are under, and which extend (1387) over a period of about five years from 1927 to 1932. The operation of the Laramie-Poudre flume is remarkable under the conditions, as evidenced by the measurements shown on Defendant's Exhibit E-1. In my opinion taking it throughout the season, I am absolutely convinced that the flume installed at the outlet of the Laramie Poudre tunnel operates well within the practical limits of accuracy even though it is hampered by debris from the channel. It is remarkable even under such conditions as existed it stays so close so that I think with ordinary care it would be practically well within the limits of accuracy. I don't know any other measuring device that could be used there (1388) to better advantage.

[fol. 900] (1389) BRUCE G. EATON, witness in behalf of defendant:

Direct-examination.

By Mr. C. D. Todd:

I reside at Eaton, Colorado; I was born in Weld county, Colorado, and have lived there 64½ years; I have been engaged in raising cattle and horses, farming and ditch business all my life; my father was Benjamin H. Eaton, and his business for the greater part of his life in Colorado, was farming, and building ditches and reservoirs; he was a

pioneer in building large ditch enterprises in Weld and Larimer counties; he built more ditches and reservoirs than any other man; a few of the larger enterprises (1390) he built were The Larimer and Weld Canal, some 65 miles long, The B. H. Eaton Ditch, the main part of the Whitney Ditch, and he worked on old No. 2 ditch, and built the High-line Ditch down at Denver, 81 miles long, and two other ditches on the South Platte river near Ft. Morgan and Sterling. He also built the Windsor Reservoir, the McClellan Reservoir, The Eaton and Law, the Loop, Angel Lake, and Wood Reservoirs.

My father was also engaged in extensive farming operations, principally under the B. H. Eaton ditch, the Whitney Ditch, and the Larimer and Weld canal; he owned and irrigated about 14,500 acres of land under these ditches. After the extension of the Eaton Ditch (Larimer and Weld canal) was constructed, commonly known as The Owl Creek Supply and Irrigation Ditch, he acquired (1391) 5½ sections of land under said extension.

My father died in 1904. During his lifetime I was intimately associated with him in his land and ditch business. I quit school when I was 18 and went to work for him and continued until his death. My mother and I inherited the major part of my father's interest in said lands, ditches and reservoirs, and I have since continued to operate these ditches and farms. My mother died in 1914. I was executor of my father's estate for years. Between my father's death and my mother's death I had sole management of these enterprises. My father was sick for 4 years and I had entire charge. After my mother's death I became sole owner of these lands and interests in ditches, and (1392) [fols. 901 & 902] have since continued to operate them, and I was the sole owner of them until 1918, when we formed a family corporation known as "The Eaton Investment Company" and conveyed the property to it, and I have been President of that company ever since. My oldest son, Rex C. Eaton, now 40 years old, has worked with me. After he got through school he was put in charge of certain parts of this work, until he became the manager. He worked two years while going to school, and since has been practically the manager.

(1393) Among the other enterprises which my father initiated and carried forward to his death was the Moun-

tain System known as The Wilson Supply Ditch. He was able to look after this enterprise until about 4 years before his death when he became ill and I became the chief manager through the corporation that owned this ditch. As such manager I had control of the construction of The Wilson Supply Ditch, sometimes called the divide ditch, and sometimes called The Sand Creek Ditch or System, and a portion of it is called the Deadman ditch. This ditch has been known by all these names, but they all refer to the same enterprise. By means of these ditches we obtained waters from the tributaries of the Laramie river and also from Sand creek and divert the same over into Sheep creek and into the Cache la Poudre river; a part of it is the Deadman ditch and Columbine. We use the Sand creek to carry the water from Deadman; we dammed it into one (1394) of the head forks of Sand creek, and pick it up at our dam in the Sand creek ditch.

Witness looks at a blue print map marked Defendant's Exhibit J-1, and stated that it is a map of the Sand Creek Ditch System.

Defendant's Exhibit J-1 omitted. Printed side page 3059 post.

It shows the contour line, or course, of the Columbine, Deadman and Sand creek ditches, and states that the same is owned by the Divide, Canal and Reservoir Company; said map was made by Charles Hedke; he was employed by said company to re-survey the ditch, and make a map of the whole of it, for use in our business. This exhibit is a blueprint of a map he made. This ditch is described as follows: Beginning at the lower or north end in section (1395) 22 [fol. 903] and 23, township 11, north, of range 75, is a line indicating the ditch from Sand creek to Sheep creek, marked "Sand Creek Ditch" and it is also sometimes called the "Divide Ditch", also "The Wilson Supply Ditch"; it is all one ditch and was originally filed on and constructed, as "The Wilson Supply Ditch". In section 22 in Sand creek is the headgate of the Sand Creek Ditch; there is a dam there and also a headgate. Sand Creek runs north and extends over into Wyoming to the Laramie river; it also extends south into Colorado from our dam and headgate into section 16, as shown on the map; from a point in section 16 there is a ditch through section 15 and

into 14, and on the map it is marked "Deadman Ditch"; it intercepts Deadman creek; it is also known as Deadman ditch; and after leaving Deadman creek this (1396) ditch extends south through sections 14, 22, 23 and 26, and intercepts two other streams; do not know the names, but we called them Sand and Deadman, tributaries of Deadman creek; near the south line of section 26 is a tie that indicates the point where Columbine ditch was surveyed to run water over into the Deadman system; that indicates the beginning of the Deadman ditch; further up in section 35 is shown the Columbine ditch; it was originally made to drain into a small fork running into the north fork of the Poudre, and then it was re-surveyed to run on down the Deadman; this connection between the Columbine and the Deadman has never been constructed, and water has not been diverted from the Columbine ditch into the Deadman ditch.

(1397) I remember when adjudication proceedings were had in water district No. 48, which includes the Laramie river and its tributaries, when the decree was made. The Divide Canal and Reservoir Company appeared in that proceedings, and its attorney was James W. McCreery. I have made diligent search and inquiry with the clerk of the court in which said proceedings were had to procure a copy of map and statement filed in that proceedings, and we have made every effort to find them; but were unable to do so.

Witness looks at Defendant's Exhibit K-1 and stated that the document was a copy of the statements of claim [fol. 904] filed in the adjudication of priorities of right of water in water district No. 48, division No. 1, state of Colorado, by the Divide Canal and Reservoir Company. I was President of that company at that time and employed Mr. McCreery to file a statement (1398) of claim and make the proof. I have examined Exhibit K-1 and it seems to be a true carbon copy of the original that was lost. The copy is signed by James McCreery. I verified the original. I signed the verification but did not sign the copy as to the verification; the verification was taken by Henry Luther. He also put his verification on this carbon copy, with his seal.

Defendant offered in evidence defendant's Exhibit K-1, the material parts of which are as follows:

Statement of Claim of Priority of Divide Canal and Reservoir Company, as claimants of water priorities for irrigation and storage in water district No. 48, state of Colorado, and states that petitioner is a corporation, organized under the laws of Colorado, and is owner of Sand Creek Ditch, and Reservoir System, so-called, being a system of ditches constructed for the purpose of taking, diverting and appropriating, for beneficial uses water from the Columbine Ditch, from Deadman Creek and its branches, and Sand Creek Ditch and its branches, in Larimer county, Colorado, and to carry the same through and along Sand Creek to a point on Sand Creek, hereinafter described, and thence diverting from Sand Creek, and carried over the divide between the head branches of the Laramie river and Poudre river, into Sheep creek, a tributary of the Poudre river, to sundry places of diversion, all of said waters to be used for direct irrigation, and for filling certain reservoirs; and said claim of priority is made for all the waters collecting and flowing in said creeks and tributaries thereof, and collected and diverted by means of said ditch system.

The original headgate of the Deadman ditch as shown upon said map (J-1) is located at a point north 22 deg. 10′ west, 950 feet south, from the south quarter corner corner of section 26, township 10, north, range 75 west, and the original line of said Deadman ditch is described by courses and distances along the line, as shown upon the map of said [fol. 905] ditch marked Exhibit J-1, and discharges into Sand Creek, at a point south 7 deg. 25′ east 2100 feet from the northwest corner of section 15, tp. 10, n. r., 75; thence following down the channel creek, used as a part of said ditch system, about 3½ miles to the original headgate of said Sand creek ditch, at a point on Sand creek south 84 deg. 45′ east, 560 feet, from the south quarter corner of section 22, tp. 11 n., r. 75 w.; thence by courses and distances to a ditch and tunnel over and through the dividing mountain to a point in the east half of section 23, tp. and range aforesaid, which is south 10 deg., 25′ west 1500 feet, from the north quarter corner of section 23, tp. and range aforesaid, and into Sheep creek, a tributary of the north fork of the Cache la Poudre river, and thence down said river to the ditches where diverted and used for the irrigation of lands. The descriptions of the courses of said ditches is the same

as set forth on defendant's Exhibit J-1, a map of said system.

As to the dimensions of said respective sections of said ditch, the same are as follows: That part of said ditches above described, formerly known as Columbine ditch, was laid out and built to the dimensions and capacity as follows: Width on bottom, 4 feet; depth about 3 feet; width on top 7 feet; and grade about 10 feet to the mile; with capacity for carriage of water of about 50 feet per second of time.

That the Deadman ditch, so called, at the head has dimensions and capacities of about 4 feet wide on the bottom, 7 feet wide on top, 3 feet deep, and a carrying capacity of about 50 cubic feet per second of time, increasing in size and capacity so as to take and carry the increased quantities derived from the various branches of Deadman creek, and water courses crossed by said ditch down to Sand creek, and at Sand creek, and where said ditch empties into Sand creek, it has dimensions and capacity following: 8 feet wide on bottom, 13 feet wide on top, carrying 3 feet in depth of water with a grade of about 10 feet to the mile, and a carrying capacity of 250 cubic feet per second of time; that the [fol. 906] capacity of said ditch where it leaves Sand creek, running thence to Sheep creek, is, width on bottom about 10 feet, width on top about 16 feet, carrying 5 feet in depth of water with a grade of 10 feet to the mile, with a carrying capacity of 500 cubic feet per second of time; that the entire length of said ditch system is about 11 miles. Claimant prays an appropriation of 250 second feet from Columbine and Deadman creeks and their branches, and a like amount from Sand creek, as of the date of June 15, 1899.

Same is signed by James W. McCreery, as attorney for the Company, and was sworn to by Bruce G. Eaton, President of the Company, on March 2, 1906, before Henry Clay Luther, a notary public in and for Weld county, Colorado, with his notarial seal affixed.

(1398) Defendant thereupon offered in evidence a certified copy certified by the clerk of the district court of Larimer county, Colorado, of the amended statement of claim of The Divide Canal and Reservoir Company, in said adjudication proceedings, and the same was offered in evidence as Defendant's Exhibit L-1, which exhibit is entitled in the same proceedings, and makes the same claims of appropriation, as in the original statement, but gives a particular

course and descriptions of the channel of Sand creek from the point where said Deadman ditch discharges into Sand creek, down to the point of diversion from Sand creek over the divide into Sheep creek, and claims the course of Sand creek as a part of said ditch, and the right to divert the waters diverted by Deadman creek into Sand creek. This amended statement is verified by Bruce G. Eaton, as president of the company, on March 10, 1906, before Henry Clay Luther, notary public, and the same was signed by James W. McCreery, as attorney for claimant company.

[fol. 907] (1399) In said adjudication proceedings I do not remember whether Mr. Hedke was one of our witnesses or not. I think this map was prepared by Mr. Hedke and was used in that proceedings. We have made search to find the exhibits which were introduced in that proceedings but have been unable to find them. Mr. Hedke was an engineer that lived in this vicinity and carried on the business of civil engineering for several years; he lived in Ft. Collins, part of the time, and part of the time at Eaton; he has been away from northern Colorado for years; at present he is at San Antonio, Texas.

Defendant offered in evidence said map Exhibit J-1, being a map of the Sand creek system; this map is the same map concerning which the witness has testified as made by Mr. Hedke, and concerning which he was interrogated, as to the various portions of said ditch system shown thereon, and in which he stated it showed substantially location and line of said Sand creek system of ditches, also known as The Wilson Supply Ditch.

(1400) I know that Phillip Wilson and R. Q. Tenney were the original promoters of The Wilson Supply and Columbine ditches, and before my father became interested in the construction of this system of ditches, Mr. Wilson and his engineer, Mr. Tenney, had made a map and statement of The Wilson Supply Ditch, and had filed the same with the state engineer, and also in Larimer county; the witness looks at complainant's Exhibit No. 5, being a map and sworn statement prepared and filed by Phillip Wilson and R. Q. Tenney, in the office of state engineer, on July 23, 1897, and pointed out the various segments and portions of said Wilson Supply Ditch, and concerning that portion thereof, from Sand creek to Sheep creek in sections 22 and 23, tp. 11, n. r. 75 w.,

stated that said portion of said Wilson Supply ditch from Sand creek to Sheep creek is now called the Sand creek ditch; that at said point Sand creek and Sheep creek are about a half a mile apart, with a Hog Back between; that Sheep creek runs northeast where it is close to Sand creek, and a little farther down, it goes near east, and still further down, it connects with the north fork of (1401) the [fol. 908] Poudre. The ditch shown on Complainant's Exhibit No. 5, being a map and statement of The Wilson Supply Ditch, is the same ditch shown on defendant's J-1.

The irregular line on said exhibits extending from the headgate of The Wilson Supply ditch or Sand Creek ditch, south into the neighborhood of section 15, 10-75, is Sand Creek itself, and is the same line of creek shown on Exhibit J-1. From Sand Creek the ditch is constructed through sections 15 and 14, and is a part The Wilson Supply Ditch. It intercepts and is a feeder to Deadman Creek. Our ditch is connected with Deadman creek and extends down and discharges into Sand creek. Mr. Wilson and Mr. Tenney made other filings about a year later. The date of the filing of the Wilson Supply ditch, as shown by Complainant's Exhibit No. 5 is July 21, 1897, and on line 10 of statement it says that the work of construction was begun on June 11, 1897; as the ditch was constructed it was substantially along the line and of the (1402) dimensions set forth in said statement of claim.

Defendant had marked a paper Defendant's Exhibit M-1 which was examined by witness who stated that it showed that it was a map of Columbine Ditch Extension, and that it was filed by R. Q. Tenney, on Dec. 15, 1898. This ditch known as Columbine Extension Ditch was incorporated into and made part of our Sand creek system as an extension of the Wilson Supply Ditch from Deadman creek south; it was constructed about the same time as the Deadman feeder ditch. The Deadman was built in the summer of 1902, and after they got water running in that, they went on and built up through this next creek; we got it built as far as the next creek that fall; did not get clear to the end on account of the coming of winter, and the next spring we built it on up to the next creek; that is in the spring of 1903. I take it for granted that the line of ditch shown on Exhibit M-1 as the Columbine Extension Ditch is along the same line as the (1403) south end of the Deadman ditch

shown on Exhibit J-1; we built it along the line of the survey, that had been made and filed on that map. Some [fol. 909] places we changed the line and improved the same by making some cuts once in a while and things of that character. After the construction of this Wilson Supply and Columbine Extension ditch, and after the Divide Canal and Reservoir Company acquired title, it was all operated as one ditch, and at first under one common name.

Defendant offered in evidence said Exhibit M-1, the map and statement of The Columbine Extension, and an inspection thereof shows that it was along the same line as the ditch known as Deadman ditch, as shown on Defendant's Exhibit J-1, from Deadman creek, in section 14, to terminus thereof, near south line of (1404) section 26-10-75.

After Mr. Wilson and Mr. Tenney had made their filings on the Wilson Supply Ditch, and the Columbine Extension Ditch, they entered into negotiations with my father, to acquire an interest therein, and he bought Phillip Wilson's two-thirds interest. This agreement was made on the 5th day of September, 1898, by and between Phillip Wilson and B. H. Eaton, which agreement was marked as Defendant's Exhibit N-1 and was offered and read into the record by witness as follows:

Exhibit N-1 omitted. Printed side page. 3077 post.

[fol. 910] I am familiar with t-e signatures thereon. There is an acknowledgment of payment as follows: "Ft. Collins, Colo., Oct. 8, 1898, B. H. Eaton has this day paid to Philip Wilson on this contract $500 in my presence. R. Q. Tenney."

At the time that he entered into this contract Mr. Wilson and Mr. Tenney as joint owners of The Wilson Supply Ditch had done work along the right of way thereof; they had cleared the right of way on Sand creek in pretty good shape, and part of the way on Deadman creek from the lower end; they had cleared that in pretty good shape in places, but from Deadman creek on the way up to Columbine, and the two little creeks, they had only lined it out and barked the trees there; they had built a house on Sand creek ditch. A part of the right of way of The Wilson Supply Ditch passed over government land. Defendant had marked a tracing map as Defendant's Exhibit 0-1; the witness examined same and stated it was signed by B. H.

Eaton, R. Q. Tenney, and Philip Wilson and it was also verified by them, on 19th day of October, 1899. (1407) That it was filed in the land office of U. S. at Denver, Colo., and had thereon following endorsements:

"I hereby certify that this map was filed in this office on Nov. 6, 1899, and that the tracts marked "V" are vacant public lands of the United States.

"C. D. Ford, Register. Re-filed Dec. 11, 1901."

On this map are various 40 acre tracts to indicate that they were government lands at that time. The purpose of filing this map was to get right of way through government lands.

This exhibit shows line of ditch from Sheep creek to Sand creek and from Sand creek to Deadman ditch, with many 40-acre tracts marked "V," indicating government land over which they desired to procure right of way by said filing.

[fol. 911] After the contract between my father and Philip Wilson of Sept. 5, 1898, they continued to clear a right of way along the ditch. My father concluded said contract by procuring a deed from Philip Wilson for his two-thirds interest.

A paper was marked Defendant's P-1, and was also offered in evidence.

Witness stated that said exhibit was a deed from Philip Wilson to The Divide Ditch Company. When we started to work we incorporated a company known as the Divide Ditch Company, and the same is (1408) defendant's exhibit O heretofore offered into evidence. The incorporators of that company were Bruce G. Eaton, Benjamin H. Eaton and Rollin Q. Tenney. We utilized that company to take title for a short time, and then we re-incorporated another company to take over this same property and other property in water district No. 3. This second company was The Divide, Canal and Reservoir Company, and its articles of incorporation have been heretofore introduced in evidence, as Defendant's Exhibit P. The incorporators of the present and second company were Ellis Smith, Bruce G. Eaton and Benjamin H. Eaton. After the present company was incorporated, the Divide Ditch Company conveyed to The Divide Canal and Reservoir Company all its interests, which it held in this system of ditches.

The description of the property set forth in the deed Defendant's Exhibit P-1 was read into the *record and is as* follows:

"All the rights, privileges and franchises in and to that certain claim and appropriation of water known as The Wilson Supply Ditch, statement of which was filed in the office of *the office of* clerk of said Larimer county on the 22d day of July, 1897, and in said statement described as follows, to wit: The Wilson Supply Ditch having headgate at a point on Deadman creek which bears due north from the southeast corner of sec. 15, (1409) in township 10, north, range 75 west in Larimer county, 750 feet, and having a gate discharging water into Sand creek at a point on the south bank thereof which bears due north from the quarter corner on the south side of sec. 9, township 10, north, range 75 west, in said Larimer county 1480 feet, at which point said Sand creek assumes a well defined channel; said ditch thence following the bed of Sand creek to a point which bears south 53 deg. west from the quarter corner on the west side of sec. 23, in township 11, north, range 75 west in said Larimer county, 370 feet, at which point is located a headgate by which the water hereby appropriated is diverted from said Sand creek, it being the intention hereby to appropriate all of the water from Deadman creek which naturally finds its way into the ditch herein described, and the water from the streams, valleys, and natural depression intersected by said ditch and lying above the same, and all [fol. 912] water of Sand creek which now reaches the headgate last above described not heretofore appropriated, it also being the intention to divert the water herein appropriated from the watershed of The Big Laramie River into the watershed of the Cache la Poudre river."

Said exhibit is dated Nov. 30, 1901, and was duly recorded in the office of the county clerk of Larimer county, Feb. 3, 1902, in book 151, page 193. Defendant offered in evidence said Exhibit P-1 and also N-1 and O-1.

(1410) My father and The Divide Ditch Company also procured a deed from Rollin Q. Tenney for his interest in said ditch system, and the same was marked Defendant's Exhibit Q-1 and was offered in evidence. This exhibit is deed from Rollin Q. Tenney to The Divide Ditch Company,

and is dated Dec. 2, 1901, and recorded in Larimer county on Feb. 3, 1902, in book 151, page 192. The description in *this deed is exactly the same as in deed from Philip* Wilson Defendant's Exhibit P-1 above quoted. By these 2 deeds the entire interest of Wilson and Tenney in said ditch system were acquired by the Divide Ditch Company.

Defendant had marked a deed as Defendant's Exhibit R-1, which exhibit is a deed from Rollin Q. Tenney to Benjamin H. Eaton, dated May 1, 1902, recorded in Larimer county May 6, 1902, in book 151, p. 273, and conveys the right of way of that certain ditch known as "The Columbine Ditch" located in sec. 26, tp. 10, n. r. 75 west, with all rights to appropriations of water, and any and all interests therein, and the same was offered in evidence.

(1411) Defendant had marked a deed as Defendant's Exhibit S-1 and witness stated and said exhibit shows that the same was a deed from Benjamin H. Eaton dated May 1, 1902 to The Divide Ditch Company, and the same was recorded in Larimer county May 6, 1902 in book 151, page 272, and the description therein is as follows:

"An undivided ⅔ interest in the ditch known as 'The Wilson Supply Ditch', located in sections 15 and 16 in township 10, north, range 75 west, and sections 22 and 23 township 11, north range 75 west, together with all appropriations of water, through or by said ditch, and all improvements and work done thereon, and the right of way."

The purpose of this deed was to convey all my father's [fol. 913] interest which he had in said ditches above described to The Divide Ditch Company.

Thereupon another deed was marked Defendant's Exhibit U-1 and same was offered in evidence. Witness stated that the purpose (1412) of this deed was to convey all the interests of The Divide Ditch Company in and to the Columbine Ditch and the Deadman Ditch and all rights of way and everything of The Divide Ditch Company to The Divide Canal and Reservoir Company, the present company, which company has continued to be the owner of The Wilson Supply Ditch or Sand Creek system of ditches ever since.

Exhibit U-1 offered in evidence is a deed from The Divide Ditch Company to The Divide Canal and Reservoir

Company, dated Feb. 15, 1904, and recorded in Larimer county Feb. 18, 1904, in book 181, at page 112. Said deed particularly describes the Columbine ditch heading in Columbine creek in sec. 35-10-75 and also another branch thereof beginning near the south quarter corner of sec. 26-10-75, extending northerly to its junction with the Deadman ditch and Deadman creek, which portion was filed on as Columbine Extension Ditch; it also describes the location and general line of the Deadman Ditch, also known as The Wilson Supply Ditch, and the ditch from Sand Creek to Sheep Creek, and all appropriations of water made by said system of ditches from the Larimer river and its tributaries, and from Sand Creek, and other property not pertaining to this controversy.

The witness examines Defendant's Exhibit P, being the article of incorporation of the Divide Canal and Reservoir Company and stated that it showed that the purpose of said company was to acquire, own and operate the Columbine ditch and the Deadman ditch and The Wilson Supply Ditch and Sand Creek ditch, and described and located each of them; that its purpose was also to acquire certain (1413) reservoirs therein named, located in the valley of the Cache la Poudre river, all of which is shown by said articles of incorporation.

The witness was asked to look at Complainant's Exhibit No. 1 and particularly at the map shown as attached in front of page 101 of said exhibit, and particularly the line [fol. 914] of ditch shown and designated thereon. After examining the same he stated that said Exhibit 1 shows the Columbine Extension as built and as a part of the Sand Creek Ditch System, substantially along the general line as shown by the various maps and exhibits. It also shows the connecting ditch between Sheep creek and Sand creek, as indicated by a line with the words "Divide Ditch". All of this system of ditches, whether known as The Wilson Supply Ditch or Sand Creek system, the Divide Ditch, Sand Creek ditch, and some times called the Eaton ditch, are all one system.

(1414) I have heretofore stated that considerable work had been done by Philip Wilson and R. Q. Tenney on this system, and on rights of way and clearing, and things of that kind, prior to my father or the Divide Company re-

ceiving a deed; after the contract made with Wilson in 1898, which was followed by deed, my father and myself, as manager of his business, proceeded with the construction of this system. In the spring of 1901 we took the outfit up there and proceeded to work continuously; my father owned an outfit that we utilized for ditch work on any and all of his enterprises; we had quite a lot of teams and ditch outfits, scrapers and stuff; we moved our outfit up there in May, 1901, and established a camp and started to work on Sand creek ditch, that is, the ditch running from Sand Creek over to Sheep creek; we kept a force of men working there until it was finished; the nature of the ground was that about half of it was through decomposed granite which is handled very easily with a little (1415) blasting, the rest was heavy rock work; also there was one tunnel.

In Sand creek we constructed a headgate and a dam at the head of the ditch and we constructed an open ditch over the mountain except one place where there was a tunnel for about 125 feet; we kept the outfit there all winter and put the tunnel through, and also did some heavy rock work in front of the tunnel; at that elevation you cannot ordinarily do construction work in the winter time, but we did the rock work and the tunnel that winter; the ditch was completed and water turned in along the first of May, I think the 8th or 9th, 1902; at the head of the ditch below the dam there was heavy rock work, and it had crevices [fol. 915] in there, and the water leaked out, and there was not much of a run; later we put a flume there about 100 feet long; we diverted water from Sand creek over into Sheep creek that summer; (1416) I did not become acquainted with Mr. B. P. Fleming who testified as a witness on behalf of the complainant who spent the summer of 1902 on Sand creek and made measurements on your ditch.

Bill Pixler was our foreman in charge of the construction of the ditch; he had worked for my father over 20 years, and did the ditch business; he has been dead for a number of years; R. Q. Tenney, Philip Wilson, and my father have all died; we do not have a foreman living who worked on the ditch; during the past 35 years the originators of this ditch enterprise have all passed away, and I think I am the only one left.

(1417) After completing that part of The Wilson Supply Ditch from Sand Creek to Sheep Creek, and as soon as the

water got running through, we left a man there to look after that and took the outfit up to Deadman; they commenced work there and completed the Deadman ditch so that its water ran out that fall, what little water there was to run; 1902 was a very dry year, but we got all the water we could get; the snow was all out, and the water would be from springs and rainfall as it came down the little creek that we tapped; after completing the Deadman feeder, so-called, we proceeded above Deadman creek to construct the Extension to what is known as the Columbine Ditch Extension, and the Columbine as shown on the various maps; we made the ditch up to the next little creek above Deadman that fall before we got snowed out; up there the snows come early as a general rule so that you have to get out; the next year they ran the water and after they had run the water we had an outfit up there and we continued on up there and we tapped the two creeks there.

(1418) The cost of constructing these ditches was close to $150,000, cash, not including the use of the teams or the scrapers or plows, or the ditch outfit or the feed, or harness; we had out own teams there and outfit and wagons, and everything of that kind, and there was no credit given [fol. 916] for that; the $150,000 was the cash expenditure on these ditches; the work of construction was prosecuted with due diligence, as fast as we could. The base of supply, our headquarters, where we would get our stuff, was from Laramie, and was a long ways, and the road from Sand Creek up to Deadman was rather steep, so that you cannot haul over 1500 lbs.. or a ton to a team, so it is slow work, and a short season because of the snow; the altitude up at Deadman is about 10,500 feet; mountain ditches are more difficult to construct than ditches on the plains and the material is harder to work, as a general rule, because you run across so much rock, and you have trees and roots to contend with; some of that right of way is through quite heavy timber, and it costs more to get the trees out of the way, than it would to build the ditch. I was not there continuously during the construction work; when they started the work I went up every month to check up the payroll and looked after things; and I followed that up until Rex started in, and then he was in (1419) charge of the work.

He is in actual charge of the ditches as they now are, the Sand creek, Deadman and Columbine. The entire system was constructed as one continuous ditch system, and the work was continuous, so far as weather conditions would permit from the time we began construction work.

Q. It has been testified on behalf of the complainant herein, and particularly by Henry J. Watson, at pp. 270, 273, 294, and 296, that the ditch as now constructed, is not the same, particularly at one point, in the southwest quarter of the southeast quarter of sec. 15, as originally constructed as shown by an old ditch on the ground, and they have submitted a photograph as Exhibit 11 purporting to have been made by J. W. Whiting, on June 16, 1932. I will ask you to look at that exhibit, and state was that ditch ever completed and used?

A. I do not know where that picture was taken.

Q. Mr. Watson, witness for complainant, at p. 294, testified: 'Q. I notice you have a photograph marked Com- [fol. 917] plainant's Exhibit No. 11, labelled, Old Wilson Supply Ditch.' Where did you take that photograph? Can you identify it on the map, Complainant's Exhibit No. 5? A. That picture was taken on the southeast quarter of section 15. On the exhibit the ditch shows a point running to the southwest, as originally constructed. Q. As originally planned? A. As originally constructed. Since that time the ditch has been cut across (1420) the top of the V shown on the print, and this picture was taken at a point on the line a little below the point where the location of the ditch is now cut through. Q. Then, as I get it, this is the southwest quarter of the southeast quarter of sec. 15? A. As shown on the blue print in Exhibit No. 5."

From his evidence and the blue print No. 5 it shows that the place was a short distance from the cabins on Deadman, where we made a cut through there, anywhere from 12 to 18 feet deep. We never constructed a ditch around that point or spur of the mountains at the time the ditch was originally constructed and used. The survey that Tenney had there went around that point, and they started to do some work there, not very much, I do not know how far they went, but when I got up there Pixler, who is a real ditch man said that was a mistake, and he said 'you can go through here and make a much better ditch' and he made this cut through. There never was a ditch constructed

around that point at all. The original ditch was made through there. That is the only ditch that was ever made there. Mr. Drummond, a witness for complainant at page 221 to 228 testified concerning this cut showing this ditch around the point through which he cut, and stated that the cut was something like 400 or 500 feet long. I (1421) think that the cut was 300 or 400 feet; it is quite a sharp Hog Back. It may have been 15 or 18 feet deep for a 100 feet in the center; we covered it with poles, because the snow drifted in at both ends and they had to tear the top off to clean the ditch out. It did not work right. In the operation of a ditch at that altitude, and particularly this system of ditches, they fill with snow in winter time.

[fol. 918] To get the water started running in the ditch in the spring, we have a headgate in each of these creeks, and the last thing in the fall, we *cash* some food up there, so that the boys going up there in the winter have something to eat and bedding, and as these headgates are raised in the fall, so that the water runs down the creek, the first thing we do in the spring, is to close these headgates, and they shovel a path through the snow and let the water cut the snow; they cut this narrow excavation near the center of the ditch in the snow, where it is easiest to cut, and they turn water in, and it melts the snow and washes down. If this was not done the water would overflow the ditch if the snow melted off in a hurry and run down; that all depends on the (1422) amount of snow we get up there. We have structures built at Deadman creek and these other little streams where we can shut the water out from the ditch or open it and let the water in. At first they put in a solid dam and let the water run in the ditch, and there was ice in it next spring, and they had quite a time getting water through that year, and then they put headgates in and cut the water out of the ditch in the winter time; this would leave the ditch dry in winter time, only snow would get in. It takes considerable time in the spring to open up these ditches and get them in operation. It depends on how hot the weather is. You can shovel the snow out, but we have always to cut it out by running water through.

In order to maintain and repair these ditches, we clean them out every fall after we run the water, and also have to clean out in the spring. In fact we have to clean out all the time to keep the water going. We have lots of wind up

there, and leaves, etc., fall in the ditch, and the snow melts above the ditch, and washes silt and stuff in there and fills the ditch up. It is one continual round of work on a ditch of that kind all the time. I do not know just what the grade of the ditch is up there at Deadman; I think there at Sand creek there is a 10 to 12 foot fall to the mile, but up at Deadman it is not that (1423) much. If the grade is heavy [fol. 919] and the ditch was not straight it would wash, and if it was a crooked ditch it would tear the lower bank all the time by the force of the water. We have trouble with sand, debris and rock, and things of that kind washing into the ditch on the mountain side; we have had some slides in on Sand creek ditch, and we have had what we call small slides on that Deadman ditch; everyone of those creek bottoms is what I call a peat bog and right below the Deadman we go through a peat bog—I guess that is what you call it—is just slides, and it is hard to go in there. When Pixler and I were up there, we had a full crew of negroes, it was so stinking you could not get a white man to go up there. They shoveled out the ditch; it must have been 12 feet wide on the bottom; the next year I went up there and the whole upper side had slid down, and it meant practically making a new ditch; this mushy stuff tends to run in and narrows up the ditch. The nature of the repair work on this kind of a ditch is such that you cannot do it with machinery, or even with teams. I think the easiest way to do it is with a shovel; there are some parts of it where you could slip it out all right, but at the same time in slipping it out, you could not put the dirt on the lower bank in as good shape, as by shoveling (1424) it out, and we have relied mostly on shoveling. If you get a straight piece of ground where you have more rock you have to blast and shoot when you build the ditch, and it is very hard to build, consequently they always skimp that and leave it high. That is the way you figure on it; but so far as the ditches are concerned in the mountains they are expensive to handle, and you have to keep at it all the time. In cleaning out the ditch the material is always placed on the lower bank to build it up so as to have more capacity; we make it both higher and wider to strengthen the bank; we have not had any serious break, what you might call serious on the Deadman, because that ditch is not so large; but down on the Sand creek ditch we have had two serious breaks; the Sand creek

ditch at the upper end of it is built on the side of a mountain; it is just about as steep as you would want to walk up. One of the men reported that there was a clean break [fol. 920] and he ran to the head of the ditch and by the time he got back the water was all out of the ditch, and it took the side of the ditch out, and made a cut down to Sand *creek; I judge the cut was 400 or 500 feet*; just straight up and down; it just cut a gulley out there. It was big enough (1425) to bury a building in. The material on Sand creek is disintegrated granite, and the water soaks through. We are bothered with ground squirels up there that bore holes in the side of the ditch, and we have a man riding the ditch day and night when it was running a head of water. When the ditch breaks on the side that way then you have trouble in getting the dirt because there is no dirt you can get below, and the dirt on the mountain side is about half dirt and half granite, and when the water is run in, to keep it from seeping through, you have to cover it with canvass and sacks; it is an unearthly job and an expensive job. Until you can get the ditch fixed, which may take you two weeks, you cannot use the ditch. That always happens when you have a big run of water. When there is little water in the ditch, you have no trouble; by the time you get it fixed, if it is a poor water year, your flush is gone, and you have lost the main body of your water; the ground squirrels burrow in the sides of the bank and weaken it so that the water gets out; it will wash fast when the bank get- holes in it; we put a coating of cement around the lower bank of the ditch, for quite a distance there to protect it. This cement work was a good many years ago; there was no cement originally; you know in building these mountain ditches it is a different proposition from what you are up against (1426) down in the valley. It is an education. Everything is different, the work and everything is different up there. Your soil materials and everything is difficult to handle. It is sometimes difficult to find any soil to build a bank; up there there is no soil you might say on Sand creek, that you can get, unless you haul it for quite a distance, before you could get any real soil, that would stop the flow of the water, and the seeping. After we cemented certain portions of the ditch, the ground squirrels did not bother very much. As to a man patroling the ditch day [fol. 921] and night I have not been up there lately to know.

When Rex took charge, I do not know how he runs it. I only know how I ran it while I was up there; but when we ran a flush flow of water, I kept two men there all the time at the upper camp so that they would patrol that ditch right along, and when we were running a big head of water we had one man at night and one man in the day time, and when storms come up, they both (1427) got out and watched it.

Since the ditch was construed we have had a measuring device in the ditch between Sand creek and Sheep creek after the first year; it was an automatic; there were two weirs, 100 feet apart, so as to check the water up, and then an automatic weir, with a bob in there, which registered in the box on top. This weir on the Divide Ditch was pretty well towards the tail end of the ditch; it was located below the tunnel, on the east side of the mountain, towards the Sheep creek slope; it was a standard measuring device, considered so at that time. In the year (1428) 1921, there was a new measuring device installed. It was placed above the old one and below the tunnel, and it is a cement flume; the old one was made with boards on the side and bottom; we had it cemented on the bottom, but it was a primitive affair compared to this new one.

This new automatic measuring device has charts connected with it by which it registers the flow; these charts have been shown in evidence, have circles, and record the hourly flow for a week's run on each chart. These charts I think are sent to McAnelly, the river commissioner; I would not be sure as to that; a new chart is put on every week; during the years that I was operating the ditch, there was considerable variation in the amount of water that could be obtained in the different years; there is a big difference when there is snow in the mountains, and also the amount of sunshine we get as to how it runs off, whether quickly or whether it holds up for a long time. The measuring charts that are in evidence show that in some years there are only two or three weeks' run, in others five or six, and one as high as (1429) nine. I have found from [fol. 922] practical experience that such variations occur in various years. The evidence already introduced shows that there were some four or five years that there is no record of taking any waters; I account for that for several reasons; one is that we had breaks so that the flow was over

before we could fix the ditch, and we would not have any record. Then again there were years when we had no place to put the water, the Poudre was running full, and all its ditches were drawing to capacity and there was no place to run the water in any of the ditches; in order to provide for a place to put the water and store it in the valley of the Poudre until we needed it, we built No. 8 reservoir, its annex, and the Elder; they are all linked together as one system of reservoirs; we filled them through the Poudre Valley canal; the Poudre Valley had certain reservoirs of its own to be filled, as did the North Poudre (1430) Irrigation Company, to be filled from the same canal. And they often used the ditch to its capacity, so we were unable to get storage when the flush flow was on, and after the flush was over we did not have the water to run; as a result, and in order to store our water, I built the Wooster reservoir; it is a channel reservoir built on Sheep creek; a tributary of the north fork of the Poudre river; that is the creek into which we discharge our water from the Sand creek system; it is located about four miles below the end of the Sand creek ditch; it is built in (1431) the channel of the stream; I think the dam is 70 feet high and has a facing of concrete on the front side; the construction of this dam is another reason why we did not have water; when we put in that dam it was made of disintegrated granite, and very little soil in it, and it seeped, and we put a concrete facing 6 inches thick on the front side, and we thought we had it fixed all right, but it leaked just the same; we figured on going down to bedrock, and we went down 15 feet through the mud and started on the bedrock and then cemented on up to our six inch concrete facing; during that work we could not run any water down there; there were two years we were working on the Wooster reservoir during which [fol. 923] this construction work was going on in which it was impossible to store water in the reservoir, one when we put on the concrete facing, and the other when we went down to bed rock; then there were two or three years when there was so much water in the Poudre river we could not put any into it; in other words you just get a world of experience with that kind of a ditch. This dam or reservoir in Sheep creek also gathers water from the flow of Sheep creek as well as the water we bring over from Laramie river and Sand creek if the headgate thereof is not shut down; on

account of older appropriators on the Cache la Poudre river and its tributaries require the waters of Sheep creek to supply their appropriations; the water commissioner watches us like a hawk.

(1432) After the water from Sand creek passes over the measuring weir or flume or measuring device we have described, the water discharges through natural water courses into Sheep creek, and flows down to our or Wooster reservoir; we hold the water there during the first flow and then when there is a chance to take it other places, like the Halligan dam, the river commissioner turns it out into other places; it is handled entirely by the river commissioner; at the present time the largest part of our irrigated land is under the Larimer and Weld canal; this canal is used as an inlet for filling the Windsor reservoir; when there is water for storage they use the canal for filling the reservoir; if they do not need it to their entire capacity, we store water in that (1433) reservoir, that is if there is capacity in the Larimer and Weld canal to carry some of our waters; we also run some of this water into Angel Lake, and Wood's Lake; but the entire water proposition is handled by the river commissioner. He is in absolute charge of all the water that is run or turned down, and he tells us where it is going to be run. When the water is turned into these ditches and stored in these reservoirs, it cannot be gotten back into the same ditches, unless we transfer it by a system of exchange, and our mountain water is used and that of the Water Supply and Storage is utilized by a system of exchange so that it may be stored in the upper basins or reservoirs and later can be dropped down to a ditch below where [fol. 924] it is required, There are other ditches that are on the Poudre river that are also used in this matter of exchange.

We keep records of the measurement of water that is brought over from the Laramie River and Sand Creek, through our system; we have a man at the reservoir that puts on the chart, and takes it off and sends it to McAnelly; Rex can tell you more about that than I can because when I did it up there we did not have telephones nor automobiles, and it had to be done with a team, and we (1434) only sent in a record when we went to get supplies at Laramie City; the chart was always sent or delivered to Mr. McAnelly, the river commissioner (of water district No. 3,

Colorado). It was necessary to have this information for him when it came to redelivering the water, either the water we brought over, or the water which was given in exchange for it; it was necessary for him to keep an accurate account in order to show what was coming to us. I do not think we ever got more, although I think McAnelly is fair, but it is left entirely to him all the way through, and I suppose he has his instructions from the state engineer, and he does just exactly as he is instructed to do; of course we lose our percentage of loss to the river; after the water is gotten into Sheep Creek we either store it temporarily or use it direct through ditches and reservoirs that irrigate our lands; we get our credit for this water later during the summer.

When this Sand creek system was constructed we did not have adequate supply of water for our lands under the Larimer and Weld and other canals—particularly late water; we never had enough of water; it was our purpose in constructing this system to acquire a supplementary supply; we have sold a few of our lands (1435) recently, but we did not sell any of this water with the land.

We have since utilized what we needed on our remaining lands; if there is more than is needed in any year we rent it to people that want waters; it is customary in the Poudre Valley that when any reservoir or ditch has more water than is needed in any year to rent the water for that season, to individual farmers; we have about 14,000 acres of land under the Larimer and Weld canal as originally constructed [fol. 925] and five or six sections under the Owl Creek Extension of said canal which Extension is really a lateral about 14 miles long.

We commenced the construction of the Divide Ditch beginning in May, 1901, and continued it straight through that year, and (1436) all that winter and the next year.

Since 1917 I have turned over the actual work of managing and I have not been so familiar with this ditch system as formerly and do not go there frequently; the last time I was up there was two years ago; it is hard for me to walk around up there as I am lame. There are certain parts of the system that is difficult of access if you have to walk to get there. When we did the work of original construction on the Deadman feeder or Wilson Supply Ditch, we put in

a m .suring weir at the lower end of the Deadman Ditch, so we could measure the waters discharged into Sand Creek. While there has always been a measuring weir there we never kept track of it when I managed it. I remember water ran under the weir and cut the ditch down and left the weir standing high and dry at one time. I do not remember how many years ago I was up at Deadman; it is a hard trip; and they had put in a new weir, but I do not think there has been any time that they (1437) kept track of the amount of water running from Deadman down; whatever there was was discharged into Sand Creek and went down to our dam built in Sand Creek, and it was diverted by our ditch and dam and was carried over the Divide into Sheep Creek where it was measured.

Cross-examination.

By Mr. Greenwood:

The Wilson Supply Ditch or system, and The Divide Ditch and Deadman Ditch, and Extension above Deadman are all one system; it has always been one system; but has had a lot of different names; it has been called the Wilson Supply, The Sand Creek, Deadman, Columbine, and all of them when it was incorporated were included in the incorporation papers, and we then had No. 8 reservoir and that was also included all in one; we commenced the construction in 1901 at the lower end and built the section from Sheep Creek to Sand Creek first, and subsequently constructed the Dead- [fol. 926] man portion. In the (1438) answer of defendant on page 19 it is stated that the appropriations of water for the Wilson Supply Ditch were made and perfected as of date June 15, 1899, the date when the ditch was constructed, but the ditch was not constructed to carry water in 1899; but that is the date the appropriation relates back to. There was no ditch constructed in 1899, but the ditch was constructed and water was diverted from Sand Creek and Deadman Creek in 1902; that was the first time the water was diverted; it was a dry year and the ditch being new it seeped, and we could not control it, and it went back into Sand Creek; the ditch was not seasoned so it had very little actual use that year.

(1439) We did not keep any record distinguishing the Deadman Creek waters from the Sand Creek waters; but

it is all measured down at Divide Ditch headgate flume; we base our claim to the water both from Sand Creek and Deadman by reason of an appropriation of 1897 when the first survey was made. The Wooster reservoir was located in the channel of Sheep Creek, and that is where the Divide Ditch carries the water. Our company owns the water in Wooster Reservoir except that owned by other parties that have direct flow rights through the reservoir; that is the water of Sheep Creek, whatever water runs down through there. Mr. McAnelly figures up the amount of water we run, and then if we have any of his extra water in there (from Sheep Creek), we have to turn it out; this water from Sheep Creek if temporarily stored there has to pass on through; Mr. McAnelly looks after the matter and I think he has been up there already three times this year; he watches all of them. I do not think that he has anything to do with Sand Creek; he is watching the rights or water (1440) that may be temporarily stored in Wooster Reservoir. I think they run water now that we store there.

There are no branches or appropriators that have any interest in the Wooster Reservoir based on Sand Creek water or the Deadman water; that is all our water. Water was run in our ditch in 1902, but it did not amount to much that year.

The map, Defendant's Exhibit J-1, was made about 1904 [fol. 927] or 1905; I had Hedke go up there and make — map; he was a better engineer; the date on map is Feb., 1905; I think the map was made in Apr. 1904; I wrote up to Hedke about that but I did not get any answer; that map was made to give us a better idea of our holding up there in the way of ditches; this map shows Deadman camp with (1441) three cabins; they were constructed in 1902 when we built the Sand Creek Ditch, and Abe Wooster and Bill Pixler cut a blazed trail up there and built the cabins first, and built this ditch down that way to the head of Sand Creek, and when they got the water in there, they built this ditch around here (indicating the ditch above Deadman Creek); by that time it was fall and they had to get out; I know Abe Wooster, who formerly testified in this case, as having sold meat at that camp in 1903; we bought lots of meat of him; I do not know the man by the name of Williams or Williamson, who worked on the Divide Ditch in March, 1902; Deadman Camp was built before Columbine Camp; it was the

only camp constructed in 1902. When Tenney and Wilson surveyed this ditch they came up the old state road and surveyed the Columbine Ditch, and down to Deadman Ditch, and also the Deadman Ditch. The Columbine Ditch, now the property of the Mountain and Plains Irrigation Company, is located in Sec. 35, 10-75 and is shown on Ex. J-1, and it dumps into a little stream running into North Fork of Poudre; our company sold the physical works but did not sell the water; there is a small amount of water up there, that we would have to keep a man up there, and with the poor way we had to get it to the river commissioner, it was worth more than the water was; but we thought we could enlarge this, run this down, and have it all in one head, and we cleared the right of way from this last creek here, probably a half a mile and maybe more, but we never went on with it; we figured that it would be too much expense for what water we could get; that portion of the ditch that taps Deadman Creek has not been enlarged to my knowledge in recent years; its present dimensions are its original dimensions; in a ditch like that we make a ditch large enough in — first place to carry all the water we figured would run in there. It might be that some one (1443) going up there [fol. 928] looking at it, and seeing the amount of work done, would figure we enlarged it, when we only cleaned it out, or in other words straightened it, or lined it out in better shape than it was; it is the same as any ditch; there is not a ditch made in the world but what they would take and change in to some degree before they get it perfected in shape; but with the water running in there, I do not believe they would ever get it perfected because it changes every year, because of the sloughing off in there. There are some small tributaries or small streams that feed the Deadman Ditch between Deadman Creek and Sand Creek that are not marked on the map; there is what is called Deadman Park up there, and there are some streams on the west side that run down into Sand Creek, that does not hit this ditch; it just taps these three small streams (indicating); these are tributaries (1444) of Deadman, and Deadman runs this way over into Deadman Canon.

The witness in answer to questions propounded by pointing to the line of ditch as shown on defendant's exhibit J-1 indicated that Deadman ditch section of the ditch was from Sand Creek to Deadman creek, and that the portion of

Deadman ditch south of Deadman creek to section 26 was what was originally filed on as Columbine Extension, which was to carry water collected above Deadman creek, as a part of that ditch and that the Columbine ditch was located in or over a ridge in section 35, and intercepts Columbine and Nunn creek. This Deadman ditch (outlined on map) has not been enlarged in recent years. It was completed to this third creek when we originally made it; it is the same as it was completed from the headgate of Sand creek up here; this whole system, all as we originally constructed, has never (1445) been enlarged. The creeks above Deadman creek run off into Deadman canon and into the Laramie river; there are no creeks or tributaries to Sand Creek; it is just one stream that goes over that area.

We have to pay all the expense of installing the automatic headgate on Sand creek ditch and all the expense of operation; the only record the state has of the water diverted by [fol. 929] the Divide or Sand creek ditch is that furnished by our automatic registering device; the state officials supervise (1446) or have charge of it, but have the measuring weir, the rating flume; and they go up there and rate the flume, and check the thing over to see that it is correct; but we have to stand the expense of rating the measuring device; the state officials rate the flume on such occasions, or such intervals as they deem necessary, and with that information or data, plus the automatic registering chart, which is furnished them, they determine the discharge through that ditch into Sheep creek, and Wooster reservoir. Sand creek is an interstate stream.

Redirect examination.

By Mr. Todd:

Philip Wilson and R. Q. Tenney made three distinct filings one for The Wilson Supply Ditch, one for the Columbine Extension, which we have constructed as a part of The Wilson Supply Ditch, and also a separate filing on Columbine Ditch, for water for Columbine Creek, which discharged into Poudre direct. We originally constructed the Columbine ditch and it ran a little stream into the north fork of the Poudre; we constructed a portion of the Columbine Extension Ditch from the Deadman Creek up to (1447) two little creeks in section 23. At one time we figured on extend-

ing it on up to the Columbine creek. There was in the neighborhood of a mile and — half of ditch to build up there for that purpose, and there is not enough of water there, and we did not build that portion.

The original filing of The Wilson Supply Ditch, Ex. No. 5, was made by Wilson and Tenney; it only went to Deadman creek, the first creek; it went from Sheep Creek to Sand creek and up Sand creek and terminated in Deadman creek; that was the first creek; about a year later they made a filing on Columbine Ditch Extension; that included from Deadman creek up to these little creeks above Deadman, and went on to Columbine; the Columbine Ditch was a separate filing, and has been introduced in evidence as Exhibit C-1, made in 1897 by Tenney and Wilson. That is the Columbine Ditch, from Columbine Creek, as indicated on the general map. [fol. 930] (1448) My father, or the Divide Ditch Company, acquired all these filings. The Wilson Supply Ditch, The Deadman Ditch, and The Columbine Extension, were all constructed as a unit, as one ditch, and the entire system is shown on Defendant's Exhibit J-1, as the Sand Creek Ditch System; our company later deeded the Columbine structure as a conduit but reserved all the appropriations of water; this is shown by the deed, defendant's exhibit Y, which deed shows that only the physical ditch was conveyed (1449) and all appropriations of water were reserved.

I stated this morning that in the adjudication proceedings in water district No. 48 (Laramie river and tributaries) our company filed a statement of claim and made proof of an appropriation of water. In that proceedings our ditch was given No. 36 with the name of "The Sand Creek Ditch System". There was another ditch on Sand Creek, owned by August Wurl, which was known as the Sand Creek ditch; that ditch is entirely different from our ditch; in this adjudication proceedings water rights under the laws of state of Colorado, we established our priority from the date of original construction rather than from the date of Completion; I have been a party to a good many of these adjudication proceedings. In the findings and decree of our Sand Creek System we have ditch No. 36, dating from June 15, 1899, with priority No. 38. The findings and the decree of this proceedings for The Sand Creek Ditch System, being the same as The Wilson Supply Ditch System, are set forth in full in defendant's exhibit G heretofore introduced into

evidence, as a certified copy of the findings and decrees in case 1885 in the district court of Larimer county, Colo., entitled "In the matter of the adjudication of priority of right to the use of water for irrigation in water district No. 48, State of Colorado; and the findings concerning the Sand Creek Ditch System is found at page 7 of said decree, and the decree is found at pages 33 and 34 of said findings and decree, and the same was made and entered on October 11, 1906, which findings and decree were read into the evidence of this witness, at pages 1450 to 1453, and are as follows:

[fol. 931] Findings

(1451) "No. 36, Sand Creek Ditch System:

"It is owned by The Divide, Canal and Reservoir Company.

"It includes Columbine Ditch, Dead Man Ditch, and Sand Creek proper. Columbine ditch has a capacity of 40 cubic feet of water per second of time which it at present discharges into the north fork of the Poudre river. Dead Man ditch has a capacity of 117 cubic feet per second of time which it discharges into the head of Sand Creek. These waters, after being discharged into Sand creek run naturally down that stream cutting through several natural reservoirs, to a point 83 degrees 45′ east 500 feet from the south quarter corner of section 22, township 11 N.R. 75 where it is taken, with other waters of Sand creek by means of a ditch of 288 cubic feet capacity and discharged into Sheep creek, a branch of the north fork of the Cache la Poudre river, at a point 10 degrees 25′ east 500 feet from the north quarter corner of section 23. Columbine ditch commences at one of the branches of Columbine stream, cuts two other small branches and carries the water into the Poudre river. The Dead Man ditch cuts the main branch of Dead Man creek and two other branches of the same creek. The system includes an uncompleted ditch connecting Columbine ditch and Dead Man ditch for the purpose of discharging all of the waters of the system of ditches combined in the one ditch, into the Poudre river at the same point and through Sand creek and Sheep creek.

"The amount of land to be irrigated is 50,000 acres. The Sand creek ditch system is entitled to priority Number 38, by construction, for 288 cubic feet of water per second of time, bearing date, June 15, 1899."

Decree.

(1450) "No. 36. The Sand Creek Ditch System:

"That ditch numbered thirty-six named the Sand Creek Ditch system, The Divide Canal and Reservoir Company, claimant, is a ditch constructed and used for the irrigation of fifty thousand acres of land, through the use of the natural channels of Sand Creek, Sheep creek and the Cache la Poudre river and storage reservoirs belonging to the system; it draws its supply of water from Columbine creek and its tributaries, from Dead Man creek and its tributaries and from Sand Creek and its tributaries, all of said streams being tributaries of the Laramie river, by means of ditches formerly known as Columbine ditch, which has its headgate at one of the branches of Columbine creek and discharges its waters into Dead Man ditch, and Dead Man ditch which draws its supply of water from Columbine ditch and Dead Man Creek and discharges into the head of Sand Creek at a point whence the northwest corner of section 16, is north 7 degrees 25′ west 2100 feet from the north end of Dead Man ditch at the point that it empties into Sand creek, and a ditch connecting Sand creek with Sheep creek, with its headgate at a point south 84° 45′ east 560 feet from the south quarter corner of section 22 township 11, North Range 75 W., discharging its waters into Sheep creek at a point north 10° —25′ east 500 feet from the north quarter corner of section 23, T. 11, N.R. 75 W. which said Sheep creek is a branch of the Cache la Poudre river into which it discharges all the waters of the system and through which it is carried to distributing ditches and reservoirs; it is entitled by appropriation to use of water from said streams to priority Number thirty-eight by construction thereof, and thereby to the quantity [fol. 932] of water with the number and date of the priority of the appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said

streams, for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number thirty-eight, two hundred and eighty-eight cubic feet of water per second of time, or so much thereof as may be necessary to irrigate fifty thousand acres of land, the appropriation of which water took effect on and said priority dates from the 15th day of June, A. D. 1899.

[fol. 933] (1453) It is my understanding that under the law and the decisions of the courts of the state of Colorado, the appropriation for our system of ditches, is thereby established as of June 15, 1899. That is the date of relation, as it is called; you have to dig the ditch first before you can divert the water, but your priority dates to the date when you began the work upon construction of the ditch, provided it is prosecuted with due diligence.

As I have stated the man at our measuring weir or flume on the ditch between Sand creek and Sheep creek, puts on and takes off the charts, and makes a report to Mr. McAnelly; he does this under the directions of Rex I suppose. I have been not actively connected with that part of the work since 1917, when John Armstron was water commissioner. We rely upon the report and the computations made by McAnelly (water commissioner, water district No. 3) on this automatic device in determining the amount of water that we are entitled to on the Cache la Poudre river. The Wooster reservoir in some years when there is abundance of water in the Cache la Poudre Valley stores some of the water of Sheep creek upon its own appropriation, but we do not get much water out of (1454) Sheep creek. We have to turn out the Sheep creek water which comes into the reservoir if it belongs to other waterusers down the river; if it is stored when no need for it, from Sheep creek water we retain it in the reservoir.

Recross examination.

By Mr. Greenwood:

I am not lawyer enough to state the various kinds of decrees that can be obtained under the laws of Colorado. I have heard of conditional decrees and of final decrees. I do not know any others.

[fol. 934] (1455) REX C. EATON, witness in behalf defendant:

Direct examination.

By Mr. C. D. Todd:

I am 40 years old and son of Bruce G. Eaton, and resided in Eaton and Greeley all my life. My business since I have been old enough, and particularly since the summer of 1916 to the organization of The Eaton Investment Company in 1918, I looked after my father's business partly as manager, and from 1918 I have been manager of The Eaton Investment Company and also managed the Divide Canal and Reservoir Company, as President and Treas- (1456) urer for said company.

The stock of The Divide Canal and Reservoir Company, and the right to the use of water pertaining therto, has belonged to The Eaton Investment Company since 1918; that corporation is a family corporation and we have consolidated all our lands and water right and other business in said company. As such manager I have in recent years looked after The Mountain Supply System of the Divide Canal and Reservoir Company, known as The Wilson Supply or Sand Creek System. Prior to my active management I had some connection and experience with this ditch system; I spent 6 weeks upon the Deadman Ditch in the summer of 1911; and 3 months at Wooster reservoir, and on the Sand creek ditch in 1912; at those times I worked under the direction of the foreman and some of the time handled the shovel. I became familiar with that system at those times. We maintained 3 camps or headquarters where we kept equipment and supplies for the men; one at the Wooster reservoir, another at Sand creek ditch, and the third at Deadman ditch. The camp down at the Wooster reservoir is about 4 (1457) miles below the point where the water of our system discharges into Sheep creek; the camp on the Sand creek or divide portion of our ditch that runs from Sand creek to Sheep creek, is about in the middle of that portion of the ditch. It is indicated by a pencil mark and word "House" on Exhibit J-1. The Deadman camp is located where the Deadman ditch connects with Deadman creek, marked on said exhibit. There was another camp on what is called the Deadman Exten-

[fol. 935] sion, in the complaint herein; that camp has been abandoned for years, and we operate from the central camp. I have worked on all the different portions of the ditch and in the first — summer of 1911 I spent a week at Wooster reservoir; they were working on it; the balance of that summer I was up on the Deadman ditch; there was a gang of men cleaning the ditch; the upper portion of the ditch; and I worked 4 or 5 weeks (1458) there. That work was the ordinary cleaning which a mountain ditch requires every year. That work was done about a mile and a half above the Deadman camp, and we walked up and back each day; and I was not working up there from 1912 until 1916. I took over the active management of it in 1917. There has not been any enlargement of the Deadman feeder or of the Deadman Feeder Extension which is in fact the Columbine Extension, mentioned in the complaint. The nature of the country and ditches up there is such that they have to have periodical cleaning; we have to clean the ditches every year, every often off and on depending on the kind of season, whether there is lots of snow and lots of run-off. If there is lots of snow and debris, that washes into the ditch, and if there is lots of water, it will run over the lower banks at times, so that they have to be replaced and repaired and there have been times when the water has washed the bank and washed portions away, and they had to be replaced.

(1459) The action of the rain and snow brings sand, gravel, and rock and one thing and another off of the side of the mountain into the ditch; as the water runs off the side of the mountain into the ditch it washes material down into the ditch, and then as the ditch water carries it along, it will fill up certain spots, so that they have to be cleaned out. In cleaning it out, we place the sand and earth and other material on the lower bank so as to strengthen the bank. The banks require continuous strengthening by reason of the erosion of the water, a great deal of the time.

At the point where the ditch discharges into Sand creek we had then and now a measuring flume; the first time I was up there they had a flume in 1911, and I was not back again there until 1917; at that time it was washed out, [fol. 936] so it was not used; later on, I do not recall the exact year, we put another flume in there; but it has never

been used; it could be used for measuring water if it was rated; we have never kept track of the amount of water discharged over that flume into Sand creek; it (1460) just goes down Sand creek to where it is rediverted at the ditch between Sand Creek and Sheep Creek; on the portion of the ditch between Sand Creek and Sheep Creek we have always had a regular constructed, operating and measuring device. The original flume, as I recall it in 1912, and I looked after the charts for a portion of that summer, and Mr. Armstrong was river commissioner, was a semi-concrete and wooden flume, with concrete on the bottom, and below it there was a check to hold the water up, so that it had an even flow over the weir; this check was about 300 yards from the end of the ditch, where it discharged into Sheep creek; it was a considerable distance east of the tunnel; later on this flume was replaced; I think in 1921; it was designed and put in under the direction of Prof. E. B. House of the Agricultural College, who designed a new concrete flume which we put in. This new flume was put in farther up the ditch at a point approximately half way between the head and the lower (1461) end of the ditch.

This new flume was constructed of concrete, and was put in under the supervision of Prof. House, at the time the work was done. He was Professor of Irrigation Engineering at the State Agricultural College at Ft. Collins; our company has employed him at times for the past 13 or 14 years to do some work for it; I was in charge of the company's business at the time this new flume was put in and was there every few days; I used to go up every week during the summer; this new flume was rated; I was there when Mr. McAnelly, who was deputy state engineer at the time, when we first rated it, and I have been there numerous times with him since when he has checked it. By checking it I mean that he would take his current meter to test it to see how it compared with previous ratings. When I was there when the flume was completed, Prof. House [fol. 937] rated it, and found it substantially the same as Mr. McAnelly's rating. This flume is lo- (1462) cated in a straight portion of the ditch where the water has a clear flow both above and below; it is a very desirable place for a flume, and that is why we put it there; in operation, when there is a substantial quantity of water flowing in the ditch it keeps the throat of the flume practi-

cally clear of obstruction; the fall of the ditch is fixed so that it will give the proper speed to the water to have a proper rating; we have an automatic registering device connected with the flume, with a gauge staff on the side of the flume, indicating the various depths to the floor of the flume; it is a standard gauge rod, and an enameled rod, and is placed in the side of the flume; it is marked off in feet, and tenths of a foot; the foot mark on it is longer than the tenths between the feet; the measuring device is attached or constructed in the center of the flume; there is a well built in the concrete with an opening at the bottom to let the water in, and there is a concrete stand there, on which the (1463) automatic register is located. The measuring staff is set down onto the floor of the flume, with the Zero End at — floor of the flume; then as the water rises it shows you how deep the water is in the flume; when you get to the one foot mark, that shows there is a foot of water on the flume; this gauge rod is 3.3 feet long in all, and above that we have a wooden rod, which is marked off in tenths of a foot up to the top of the weir or flume.

This concrete flume is 16 feet long, 15.5 feet wide, and is 5 feet deep. We have not had any trouble with the elements or the water or anything of that kind which has disturbed the setting of this flume in all these years; it is built on a solid (1464) concrete base.

We never have had sand to any extent form on the flume; we never operate the ditch when it gets below 8 or 10 second feet; we just let the water flow on down the creek. When I first became acquainted with the enterprise, there was a couple of wooden checks in the dam at Sand creek; one check was to divert the water down the ditch, [fol. 938] and the other to stop it up the creek. By it we could regulate the inflow into the ditch, or let it flow down the creek. This dam and check was used for nearly 20 years, but when we put in the new concrete flume we also put in a masonry dam, with two radio gates, one for the ditch, one for the creek and I believe that the one for the ditch is 8 feet by 8 feet, and the one for the creek, 8 by 12 feet; by means of these gates we can regulate the flow of the water either down the creek, or into (1465) our ditch. After the water is turned into the ditch it flows down over this automatic weir. I am familiar with the automatic measuring device; it has a chart by which the measure-

ments are automatic registered; there is a clock which turned this chart around; the chart is fastened on the face of the instrument, and there is a small pen arrangement there that has red ink, and as the water increases or decreases it goes up or down, and makes a mark on this chart, that is being turned around by the clock; this chart gives the depth of the water going over the flume all the time; the chart is put on and kept on for 7 days unless the water commissioners order it in sooner, or allows you to keep it on a little longer; the caretaker up there takes the chart off and sends it to the water commissioner at Ft. Collins once a week; (1466) ordinarily every Sunday; this chart is made for a week's run. The caretaker also calls up the water commissioner twice between Sundays by 'phone, from Laramie city, or Cherokee Park, and sometimes three times a week; usually Tuesdays, Thursdays and Sundays. On Sunday he mails the chart of the preceding week to McAnelly, so that the water commissioner is advised three times a week by telephone what water is being measured, and at the end of the 7 day period which runs from Sunday to Sunday he gets the automatic register chart that shows the flow of the water in the ditch, in addition to numerous trips he makes there himself. The distance to Laramie city is about 36 miles and to Cherokee park 21 miles; he goes to Laramie most of the time; we have no telephone communication at our camp. The instructions and supervision of the water commissioner of district No. [fol. 939] 3, Mr. McAnelly, which he gives to the headgate man, concerning what he shall do and his report, are about as follows:

(1467) When the first water is turned into the ditch each year, or within a day or so after the water is turned in, he makes a trip up there himself. Usually he goes with me when the water is turned in, and he superintends the starting of the automatic device, and tells the caretaker in charge what he expects in the shape of information, and what information he wants, and shows him how he wants his information sent, and the man does exactly what he tells him to do, so far as he is able to. After these instructions are given, if the man in charge of the headgate does not carry them out, he cannot stay there very long, because he has got to obey the instructions of the river commissioner, or we will not employ him. I presume I could employ any-

one but if the man employed does not comply with Mr. McAnelly, the river commissioner, we would have to get somebody that would be satisfactory. We have always kept someone there who would be under the orders of Mr. McAnnelly, and carry out his orders. Mr. McAnelly goes there from time to time himself, and instructs the man in charge, and what he expects, and what he wants, and that is perfectly agreeable to us. He sometimes slips in there when we do not know he is coming; we have no way of knowing when he (1468) is coming.

So far as I know our employes there have attended to the matters with due diligence. We have never had any complaint from Mr. McAnelly, as to the way that chart is operated, or the measuring device, or as to the making of report. As to reports to us, some years he sent us a copy of chart, and some years, he has not. We do not keep any book of water accounts showing how much water is measured from Sand Creek into Sheep creek; we get all our information from Mr. McAnelly, water commissioner, in district No. 3, because he is the one that gives us credit down below, and we have to abide by his figures. Under the laws of the state of Colorado, anyone using the river as a conduit or a part of a ditch system, the river commissioner [fol. 940] is required to keep accurate accounts of all waters brought into his district from any other water district; and he is responsible for the amount of water that is brought in, and has to apportion it out on basis he receives it. Under the rules of the state engineer there is a deduction of 5% of water turned in on account (1469) of skrinkage and evaporation, which is charged against us.

After the water is delivered into Sheep creek, we either store it in Wooster reservoir, or pass some of it through the reservoir, and divert it into ditches below. The situation on the river is such that we could run all the water into the Larimer and Weld canal, which is the principal canal for irrigating our lands; provided there was capacity above its own needs. Our headgate is many miles above that canal. As a practical proposition in the operation of the river, the water commissioner insists on handling this mountain water as follows:

Whenever he can, particularly on stored water, he endeavors to hold (store) that water up above, so that he can use it for exchange with some of the companies that have

their storage facilities below their ditches, and thereby perfect and make an exchange system: for illustration, the Water Supply and Storage Company has certain reservoirs like Long Pond, Rocky Ridge, and Lindenmeier Lake, which are filled by water diverted into their canal and dropped down into these reservoirs. This water cannot be gotten back into the Larimer County Ditch, and has to be utilized by making an exchange; we run our water down the river and hold it up some place, and we will probably get water out of the Long Pond, to take the place of the water we turned in some reservoir above. Long Pond is located a short distance above the Larimer (1470) and Weld canal, and the water in it can be turned into the Larimer and Weld canal. In this way we do not get our identical water, save in an exceptional dry season when these other companies do not have water with which to make the exchange; that has occurred only a couple of times in the last 12 or 15 years. Practically every ditch system on the Cache la Poudre river, which has reservoirs, operate by this system of exchange. Take the Windsor reservoir, which has a [fol. 941] capacity of 800,000,000 cubic feet; it lies about one-eighth of mile below Larimer and Weld canal, and is filled by that canal; none of the water stored in that reservoir can be gotten back into that canal for the use of its Windsor right holders; the way it is utilized is that it is turned into number two irrigation ditch, which lies below the (1471) reservoir where it is used, and that company has early ditch appropriations, which are taken into Larimer and Weld canal by exchange when there is water in the river for said appropriation; and the water rights in the Larimer and Weld canal get this water in lieu of water stored for those rights in the Windsor reservoir.

In the utilization of our mountain water and the other mountain water testified to in this case, the object of the water commissioner in storing it for later crops and making exchanges, is to keep it as high up on the river as he can, so that it will be available for the upper ditches; there are places where this water can be stored temporarily, and then dropped down to three or four different ditches; one of these places is the Halligan dam which is a channel reservoir located in north fork of the Cache la Poudre river, some 30 miles above Ft. Collins, and probably (1472) about 30 miles below Wooster reservoir; it is constructed in the

channel of that river like Wooster reservoir is in Sheep creek; frequently the water commissioner takes our water that is run through Wooster reservoir and puts it in the Halligan reservoir; from Halligan reservoir the water can be taken and used later by almost any ditch along the river, clear down to Greeley; there are other high up reservoirs in which the water can be stored, and at various times we have stored our water in Douglas reservoir, Cobb Lake, and No. 8 reservoir. It is diverted into the head of the Poudre Valley ditch and run down and stored in these reservoirs, or some other reservoir under that system; such as No. 5 and No. 6 of the North Poudre. Also the No. 8 reservoir owned by the Windsor Company; it is a late reservoir and has its own appropriation, but sometimes has space (1473) to restore our water. The Poudre Valley ditch at present does not have the carriage capacity [fol. 942] it had 25 years ago, by reason of some serious breaks. When the full capacity of the Poudre Valley Ditch is being used for filling the reservoirs under that ditch on their appropriations for storage from the Poudre river there is no space in that ditch to carry or store any of our mountain water, and it is often the same with other ditches, when they are diverting their full capacity for direct irrigation or storage; (1474) we have at times stored our waters in Douglas reservoir, or in Cobb lake, or in No. 8. In lieu of our waters thus stored in other reservoirs we get other waters in exchange therefor where we can utilize it for irrigation. Under the exchange system we do not have to pay any storage charges in these reservoirs, but if we restore in these reservoirs and rent or sell our waters, then we have to pay storage charge. This water so stored we utilize on our late crops, sometime after the 5th of July, until middle of September; we use it on row crops such (1475) as beans, beets and potatoes.

There is a large amount of each of these crops grown under the Larimer and Weld canal, and also some cabbage and onions; there is always a demand for late water for irrigating this kind of crops so that we can readily rent any water we have over and above our own needs; that varies greatly from year to year. If the water commissioner of water district No. 3 did not keep accurate meas-

urements and account of the amount of our water discharged over our weir in Sheep creek, and in the Cache la Poudre river, he would not have any knowledge of the water received, and he would have no way of telling how much water to deliver to us from the Poudre river; there are several of these trans-mountain water systems which also discharge into Poudre river, and so far as I know, all their water is measured and delivered (1476) in the same way. I think the owners of the waters try to cooperate and assist the water commissioner, in measuring and keeping account of this trans-mountain water, and they are very zealous in seeing that they get their share of the water, and they go up and down the river and inquire and inspect how the water is being measured and accounted for. For a [fol. 943] number of years all the major ditch companies at one time or another have employed engineers or other persons experienced in such matters, to watch and see that the water was administered correctly; in the last year or two The Windsor Company employed John Field, former state engineer, and last summer, (1932) he checked up waters up and down river from Sterling, Colorado, up, and the trans-mountain diversion; No. 2 ditch company employed a qualified engineer at one time, and before that they used to employ other people to do it; I think The Water Supply and Storage Company, and the North Poudre Company, have done the same thing. The water commissioner orders the distribution of the water, and it is carefully watched and looked after by these companies, to see that every man gets his share, and his rights. They watch the mountain diversion because if he would give us too much, it would come off of river, and they would not like that very well.

(1477) There has never been any enlargement of the Deadman ditch, nor of what is named in the complaint here, as the Deadman Extension Ditch, being a part of Deadman ditch above Deadman creek, in the years in which I have been connected with the management. I was too young to know when the original ditch was constructed; I mean since I have worked on it, in 1911 and 1912, and since. The ditch now is as it was when I worked on it in the summer of 1911. We get part of our water from Deadman ditch and this so-called extension, and discharge it into Sheep creek. It flows down Sand creek to our dam in Sand creek,

and is diverted through what is called Sand creek ditch, Divide Ditch, and the Wilson Supply ditch, over into Sheep creek; the amount of water that we get from our system varies a great deal from year to year. No two years are the same; it depends entirely on snow-fall; it also (1478) varies from week to week; depending on how warm the weather is. Some years it will drag along, one week a small amount, and the next week a large amount, if it happens to be hot or cold. There is also a great variation of the diurnal flow; that is amount flowing at 4 o'clock one day to 4 o'clock next day. We get the high water flow towards evening, [fol. 944] and then it cools off and water gets low; the elevation at Sand creek is about 9000 feet, and at Deadman ditch it is about 10,500 feet; the nights up there are cold, and sometimes ice freezes in June.

The automatic device on flume measures the water as it fluctuates throughout each day, and from the chart you can figure the total discharge in any 24 hour period, or during a week. During the past 16 years that I have been in charge, the amount of water you get from Deadman creek and the tributaries of the Laramie, as distinguished from the waters of Sand creek varies a good deal during the year; you might have one year when the snow falls are different and I imagine it would be something like 60% of our water comes from Deadman creek and tributaries, and about 40% from Sand creek.

(1479) If it appears in the evidence that some witness measured the water in our flume on July 11, 1929, coming out of Deadman, and found 3.5 cubic feet, and the next day measured the weir on Sand creek ditch and found 8 cub. feet per second, and thereby drew the conclusion that Deadman furnished only 40% of the water, and Sand creek 60% I do not think that said measurement indicated anything about relative proportion of water received during the season, because I do not believe he can say that his measurement on those dates in July would hold for the next year or the year before; it just happened to be a circumstance of that particular measurement, and gave those figures. The water then measured was not the run-off from the snow; but was seepage collected by the ditches or creek, and in such case (1480) of low water Sand creek might deliver some water longer than at times when we are getting 150 cub. ft. of water; such measurements and conclu-

sions would be no indication of the relative quantities of water coming from Deadman creek and Sand creek; neither would it be any indication of the amount coming from each stream during times of heavy snow. On account of the elevation and the drainage into Sand creek, being lower, it would run off first, and the water developed by the Deadman ditch is coming off of the high mountain, comes later; we usually find that water runs in Sand creek quite a little bit earlier than in Deadman creek.

In the spring when the season begins we find that both [fol. 945] the ditches on Sand creek and Deadman are badly drifted with snow which has solidified and is almost ice, unless it is a snow late in the spring. In order to get the ditch in condition to operate and get this snow out of the ditch, we have some men with shovels who clean a trench out through the snow to the bottom of the ditch, and if we have sufficient water running we will start (1481) water running through this narrow trench and wash the snow out.

The excavated trench in the snow is narrow, as wide as a man can shovel or walk in, and the snow is shoveled out and then we let in the water to melt or wash out the balance of the snow in the ditch; this is necessary each year, because we would not be able to get the water through the ditch if we did not get the snow out, and if we waited for it to melt, we would lose a lot of water that would go down the creek. If the ditch was full of ice, we would have a lot of ice-jams and the water would likely run over the bank and wash it out; we have had experience of that kind with ice, but the ditch did not wash out; we always tried to get this snow and ice out; we have had a wash so that it would weaken the banks, and we had to strengthen them again. I heard my father testify this morning about men patroling the ditch from Sand creek to Sheep creek; if we have water in considerable quantities we have two men up there watching the ditch, and in case of a cloudburst, or jams of snow that might come down, or any quantity of water that might come down, or some (1482) gopher holes in the ditch bank, we do not take any chances of a break, and we close down headgate temporarily. We have had experience with gophers burrowing into the banks of our ditch and causing it to break. In 1912 the season I was up there, the gophers bored through the bank; but the care-taker happened to be there just about the time the water started thru, and

by the time he got the water shut off, it had washed out a large section of the ditch; the man had a considerable distance to go to shut the water out of the ditch; if he had to go a mile down to the gate, the water then in the ditch would wash out a section of the ditch; this is a very serious [fol. 946] matter. At that particular time it took about three weeks to fix the ditch; the length of the section washed out of lower side of ditch was as long as room is wide (about 40 feet) and it washed out the bottom of (1483) the ditch, and washed a gulley out of the side of the hill. To repair it, all this would have to be refilled with material from the upper side of the ditch.

That time it carried away not only the bank of the ditch, but the bottom of it, and at that point the side of the mountain was so steep that you would have a great deal of trouble walking up it. In 1923 we had another break, which was caused by a cloudburst and getting more water into the ditch than it would carry. That happened in the early part of June. We got it repaired pretty quick that year; we used some canvas and about a thousand sacks and built up a temporary embankment so that we could run water; the situation on those ditches is such that we could not operate it with any degree of safety at all without patrolling it. I remember a cloudburst that happened shortly after this break, down on the north fork of the Poudre; that cloud-burst raised the stream in a couple of hours from 300 to 3300 second feet. On the portion of the ditch known as Deadman we do not (1484) patrol that, although a good share of the time when the water is running, we keep a man up there; we have to dig the snow out of that ditch just the same as we do on Sand creek ditch. We have a series of spill-ways at Deadman; and if we open the spill-ways we do not carry any water in the ditch; in the spring when we get ready to divert water we put the slash-boards back in the spill-way; the spill-ways are not exactly in the stream; usually a little below where the stream runs, outside of the channel, where you find a good spot. When the combined flow of both Deadman and Sand creek is about 10 sec. feet, or in that neighborhood we shut out water and cease diversion into Sheep creek. This is because quantity is small, and hardly enough to bother with, and it is difficult to run that small quantity of water through our ditch; we just turn the water down the creek

and let the ranchers use it on the plains. They can always use it when it (1485) is scarce. There has been testimony [fol. 947] given by complainant, that on three or four occasions the water commissioner or deputy water commissioner, over the line in Wyoming in charge of lower Sand creek, had some complaint, and had taken up the matter with me about turning down some waters. That was correct. As I remember it was once in 1928, twice in 1929, and 1930. He testified that we turned some water down on those occasions; we always turned by water on those occasions; Mr. Whiting, the state engineer of Wyoming, said we co-operated with him to a great extent in that matter. I think we got along a lot easier than we do between various claimants on the Poudre river. Of course they have no way of telling how much water they are entitled to. They have no measuring devices or headgates; they just take all the water available at their particular gate; that fellow will flood over his meadow as much as he can use and let it run back into the creek; most of it will get back into the creek; and the next fellow will do it the same way. (1486) In that way the same water is used over and over a number of times and I have understood from some authorities that the consumptive use is very small.

Q. Mr. B. P. Fleming, civil engineer, who spent a year on Sand creek in 1902, and a small part of 1903, stated that the return waters were great, and in his testimony, complainant introduced complainant's exhibit No. 1, being a book of some 250 pages, of which he wrote one chapter, particularly on Sand creek, and he stated that the contents of this book were the results of his investigation, and that the facts therein stated are as he found them. I will ask you to look at a table of what he calls "Seepage measurements of Sand Creek" found on p. 113 of this book and state what he found as the return waters of that stream were after the meadows were wet up?

A. He found that the return was 95.1%.

That would be a comparatively small amount of actual consumptive use. That return water 95% returning to the stream could be used by successive ditches down along the creek; their ditches do not have headgates of measuring [fol. 948] devices; I have not seen but one headgate, and I have been up and down that creek many times for a good

many years, and I would not say whether (1487) I would call that device a headgate or not. I have heard there is another one, but I have not seen it.

Cross-examination.

By Mr. James A. Greenwood:

I would say that headgates are a necessity for intelligent information as to how much water is being diverted from the stream and used; you would have to have some device to measure the water; my idea is that just turning out all you can get, is a kind of a primitive system. We would not permit it in our ditch companies. The automatic gauge chart, which our employes put in and take off the measuring devices, had to be acceptable to the state officials. I stated that they had to do it in such a way that it would be acceptable to state officials; so far as I know they have always done it in that way.

Redirect examination.

By Mr. C. D. Todd:

The headgate man that we had for many years has died.

Recross examination.

By Mr. James A. Greenwood:

There are no ranchers in Sand creek below our works in Colorado, except Mr. Wurl. The rest are in Wyoming. All their diversion works are below ours, but there is another branch of Sand creek, several branches (in Colorado) that come in below our works that we do not tap.

[fol. 949] (1489) Witness RALPH L. PARSHALL recalled for further direct examination:

By Mr. Shrader P. Howell:

(Defendant's Exhibit E-1 and also Exhibit H-1 and Exhibit T, offered in evidence.)

There is a considerable percentage of rectangular flumes installed and in use. I cannot wholly condemn the rec-

tangular flume. There are some that operate satisfactorily where conditions remain constant. In touching upon the subject yesterday, I mentioned that the rating flume was objectionable and explained that the objection lies in the fact that the shifting sands in the bed of the channel, either up-stream or down-stream from the flume, weeds and willows trailing in the water, all those things affect the velocity of the water and thus in turn change the discharge, and also likewise changes the depth of the staff or gage reading. Where the channel is constant in condition, the bed is firm, the banks are not altered, there is no reason why the rating flume should not measure within reasonable limits.

Cross-examination.

By Mr. James A. Greenwood:

(1490) My answer on direct examination as to the efficiency of a rectangular flume to the effect that it would be fairly reliable if properly operated, is something that would apply to any measuring device. I believe in the case of a Parshall measuring flume, that because of its design it is more able to maintain its own condition. It is true that any measuring device must be properly installed and supervised by someone capable of operating the device in order to give a proper record. The Parshall improved Ventrui flume will do all the automatic work, perform all [fol. 950] the functions, except putting on and taking off the charts, and seeing that the registering mechanics are in proper condition, and those things must be attended to if dependable records are made.

(1491) I know Mr. Meeker quite well, and as far as I know his reputation and ability as an engineer and hydrographer, he is entirely reliable.

I remember in preparing a memorandum, I stated in the last paragraph of that memorandum, that in my judgment, upon the data that I had at hand at the time, it would indicate that perhaps the Venturi flume at the East Portal of the Tunnel was not a practical installation.

The experiments concerning which I testified yesterday as to the effect of deposits of rock and debris approaching the throat of the flume, that by fastening butts of shingles into the channel did not make any particular difference in

recording the flow. These experiments were conducted upon a pattern where the approach to the throat was in a straight channel and not at right angles to the throat of the flume.

(1492) On June 16, 1927, when Mr. Rohwer and myself discovered that there was an error of .16 of a foot in the installation of the flume at the Laramie-Poudre Tunnel, we went to the flume and had with us our camera and engineer's level and rod, and our current meter, and by means of fairly accurate level, our observations were down to 1/1000ths of a foot at intervals of every 12 inches along the crest. We determined the mean elevation of the crest, and knowing that, we referred that mean elevation to the zero of the gage and found it in error .16 of a foot, and we applied that correction to the current meter rating of [fol. 951] May 24th. This correction was applied to the gaging; carried back.

(1493) If this observation had not been made at the time the flume was installed on June 16th, I cannot say that there would have been anything to disclose that error in the official records of the Engineer's office in Denver, unless some of their engineers had detected it. In other words, someone would have to detect it in order to disclose that the record was not correct. There would have to be some evidence to show the error. When I discovered this error, a note was made by myself on the register chart, at that particular day and hour. Perhaps, although I do not know that I had any authority I had access to the instrument and I put that record on there as an indication that the true record would be as (1494) indicated. I do not know why the error was not discovered before we found it. The point I had in mind in putting that notation on the chart was evidence that the previous gage height was in error by that amount, and if Mr. Meeker had examined those charts he probably would have noticed that correction was there. That would also be true of Mr. Hinderlider had he examined it. Each week's record, as shown by the automatic charts, is a record in itself, and the gage heights indicated from the time a chart is taken out and a new chart is put on, the degree and dates should correspond. Each chart has its relation to a previous chart, if they are keeping a (1495) continuous record. The chart I would think would be relied upon to determine the

[fol. 952] amount of water passing during the time it is on the registering device because even though you had omitted to put down the gage height at the end or beginning of a new chart, it would record the proper gage height, providing the instrument was properly set. If there was no entry of the gage height at the time of setting the chart, I would determine the depth of the water by the instrument graph, that is, the graph on the chart, until I came to a place where I knew definitely the record agreed with the staff gage. In order to get a definite point I would go either to the end of that chart or the beginning of the previous chart. I think the Bristol gages are accurate (1496) within practical limitations, and in determining accurately the amount of water that passes in any particular period it would be necessary to have the base or starting point.

Direct examination.

By Mr. Shrader P. Howell:

It is the usual practice when the old chart is removed to set the figure of the recording device at the same point on the new chart as indicated on the chart which has been removed, and thus there would be a continuous record. These charts ordinarily keep a record for a seven day period and when a fresh or new chart is placed the gage height is the same on the new chart at the start as indicated on the (1497) old chart when finished. If the pen is set on a new chart at the same height as when it was removed from the old chart, it would correctly record the height, except that it must be kept in mind that if the interval of time between taking off the old chart and putting on the new one had been sufficient to change materially the principle, it would indicate a lesser or greater amount; but ordinarily it would not change materially during the interval of changing the charts.

I find my reference to my diary that on or about the 28th [fol. 953] or 29th of April I prepared the drawings for the Parshall Flume to be installed at the Laramie-Poudre Tunnel outlet and the ratings or gagings made on this structure were made on May 24th, 1927. The structure, I would say, was built during the first two weeks of May, 1927, which is approximately a month prior to the 16th day of June, 1927, on which I made these gage readings.

(1498) I made the corrected notation for error of .16 of a foot on the chart on June 16, 1927. This chart on which the notation was made, concerning which I have testified, was I think part of the official records of the State Engineer's office of the State of Colorado. So, if that notation appeared in the records of the State Engineer's office, an engineer or any one examining that official record, and seeing the notation, would be able to make the proper correction.

Recross-examination.

By Mr. James A. Greenwood:

This record, without the correction which I made as indicated, would be inaccurate, and in error .16 of a foot. That is it would be in error up to the point where we changed the chart to agree with the true gage height, June 16th, and sub- (1499) sequent to that time it would be accurate.

I think I informed the State Engineer immediately that we had made this finding and corrected the gage accordingly, but I do not know whether the State Engineer made any correction on the previous charts.

Redirect examination.

By Mr. Shrader P. Howell:

It is not an unusual procedure and in fact it is the general thing in checking charts of this sort to make notation of an error such as was made in this case. In our working [fol. 954] with these flumes in our experimental way, when we find things that are not correct, we attempt to set it right and call attention to it.

(1500) Recross-examination.

By Mr. James A. Greenwood:

I cannot say just what procedure should be followed by the office of the State Engineer, when he has been notified as to an error of this kind, or whether he would immediately change all records that were affected by such error or not. If I were State Engineer and received such notice I would instruct my assistant when these were computed

that the correction should be accounted for and carried back so far as it had any effect, and I have no information as to whether that course was followed or not.

[fol. 955] WILLIAM J. MCANELLY recalled for further direct examination.

By Mr. Shrader P. Howell:

(1501) The gauge reader at each of the trans-mountain diversions is required to take charge of the register, place the sheets thereon, check the staff gauge with the register and report the flow of water for each 24 hours at stated intervals. The gauge reader is not required or is not necessarily a man of technical training nor one who has had previous experience along (1502) that line. The only qualifications I consider necessary to make a competent gauge reader are that he be conscientious in his work and follow the instructions that are given him and to compute the flow of water on the charts in 24 hour periods. My instructions to the gauge readers are to place the charts on the register, giving the date, the staff gauge height, and the name of the ditch, initialed by him, and that he is sure that the pen is set on the chart to coincide with the depth shown on the staff gauge. He is instructed to figure the flow of water between certain days, at certain times of the day for the full 24 hour period, giving the mean flow for the previous 24 hours to me and reporting it to me so that I may make proper delivery in the Poudre Valley of such water. The automatic register makes the record of the flow for a period of 7 days and the chart is then sent to me. The measuring (1503) device at the Skyline Ditch is a timber structure, 12 feet wide, with a metal gauge staff installed, which measures water to hundredths of a foot. There is a Bristol automatic register to keep track of the flow of water through the flume. This register is a device as I have previously described it, and the charts on the register are removed each 7 days and sent to me, except the first chart which may have only 2 or 3 or 4 days shown on it. The (1504) trans-mountain diversion ditches being [fol. 956] largest at the point of discharge rather than at the point of diversion, the registering devices are placed

at the lower or discharge end of the ditch so that all water gathered in the ditch necessarily passes through the flume and is registered by means of the automatic devices. I have been familiar with the measuring device in the Skyline Ditch for 19 years and it had been there for some time before that. Current meter measurements are made at the rating flume on the Skyline by (1505) the State Engineer's office almost every year, and that has been true since 1921, when I became Water Commissioner. Pat Costigan is the gauge reader at the Skyline Ditch an dhas been on the ditch for a number of years. I consider him competent to discharge all of his duties as gauge reader and to properly care for the recording device. In my opinion the measuring device of the Skyline Ditch properly measures and records the diversion of water through that ditch and has always so recorded it since I have been Water Commissioner. (1506) The diversions through the Skyline Ditch in June, 1926, were not reported to me as diversions and no credit was asked by The Water Supply and Storage Company for any water other than is shown on my weekly reports, however, the automatic register sheets which showed those diversions went through my hands and were sent to the State Engineer's office as a part of his records.

The measuring device installed at the outlet of the Laramie-Poudre Tunnel is what is known as a Parshall-Venturi flume, which is a 6 foot wooden structure, set inside the old concrete rating flume. There is a Bristol automatic register installed in this flume and it operates in the same manner as the automatic register at Skyline Ditch. The register shows the depth of water, and the time and the amounts are computed in 24 hour periods. (1507) The charts are sent to me and from me to the State Engineer. There is a staff gauge in the stilling well and there is also a staff gauge in the flume. The Parshall-[fol. 957] Venturi flume was installed at the Tunnel in 1927. The Parshall flume is supposed to be computed at the laboratory and to be absolutely accurate, but it is checked with the current meter at different times. The laboratory tests are of discharges at various depths, and a table is prepared and the discharge may be ascertained from that table. I am familiar with the current meter measurements made by Mr. Hinderslider on May 24th and

25th, 1927, shortly after the Parshall flume was installed, and at that time he furnished me with a temporary rating table, and I used (1508) the temporary table in my administration of the tunnel diversions until adjustments were made in the flume. The Parshall flume had been installed sometime in the spring of 1927 before water was turned through the tunnel. It is my opinion that the Parshall flume in connection with the automatic register at the Laramie-Poudre Tunnel correctly measures and records water diverted through that Tunnel. There are several of the so-called Parshall flumes installed in ditches throughout District No. 3, and it is my opinion that they are (1509) accurate in the measurement of water diverted. Prior to 1927 there was a concrete rating flume used at the tunnel. If the distribution of water through the tunnel was not found to be reasonable accurate, there would be many complaints. I know that appropriators in District No. 3 have at various times employed men to go to the tunnel and check the measurements and we have never found an error to this time. The prior device was a concrete rectangular rating flume, which was the (1510) best measuring device available prior to 1927. The tunnel always carried a great deal of debris which caused more or less trouble, but finally Mr. Parshall perfected his flume and it was installed with the expectation of getting more uniform measurements than could be obtained by any other method. The rectangular flume of which I have spoken was rated very often on account of changing conditions at the tunnel, and these measurements were made for correcting in accordance with new conditions as they arose. [fol. 958] (1511) A man by the name of Sam King is gauge reader at the Laramie-Poudre Tunnel, and this is his third year. I consider him competent to perform all the duties of the gauge reader, and he has been fully instructed as to his duties and the responsibility attached to his position. The gauge readers at the tunnel since I have been Water Commissioner have been Mr. King, Mr. Loose, who was there one year, Mr. Turner, who, I think, was there 2 years, and Mr. Duvall, who was there 10 years and perhaps longer. Homer Duvall, a son of Mr. Clem Duvall was there for a short time finishing up the work (1512) after his father died. I consider that each of these

men were competent to discharge their duties and the records that each of them sent in were satisfactory.

With reference to the measuring devices at Sand Creek Ditch, there is a 15½ foot wide rectangular rating flume, built of concrete. There is a Bristol automatic register installed in the register, the same kind as is installed at the Skyline Ditch and at the Laramie-Poudre Tunnel. The flume is placed in the best section of the ditch possible and is in practically a straight section. As I remember, the flume was built in the fall of 1921 to replace the wooden structure that had theretofore been used. It (1513) has the same general equipment, including the stilling well and staff gauge, as I have described at the other transmountain diversions. The measuring flume was designed by Professor E. B. House, professor of irrigation engineering at the Colorado Agricultural College, and it was installed under his supervision. A rating table (1514) was prepared by me at the time of the installation of this device and it has been used continuously since that time, and it has been checked by me on numerous occasions and found to be accurate. The (1515) flume on this Sand Creek or Wilson Supply Ditch is located at a point on the ditch where it is possible to drive directly to it.

(1516) E. P. Jones is the gauge reader at the Sand Creek [fol. 959] Ditch. This is his second year and I consider him competent to perform his duties. He was preceded by a Mr. Hoppick, who was also competent. In addition, I have always been at the Sand Creek Ditch when water was turned in, with the exception of this year, and I have personally set the pen on the chart each season since I have been Water Commissioner until this year when water was run two days before I got there. I have done this with relation to this particular ditch for the reason there is no telephone communication and I have wished to be sure that the gauge reader was started off right each season with respect to the registering device and charts, so that we might show proper delivery of water. Mr. Hoppick served as (1517) gauge reader on the Sand Creek System for about 4 years, and prior to that there was a man by the name of Dugall. I consider that each of these men was fully competent to discharge their duties. I receive reports from the gauge reader at Sand Creek three times each week by telephone and I get a written report

once each week, which report (1518) comes in with the register sheets. The reason I do not get daily reports on this diversion is that the man in charge is compelled to drive 27 miles to Laramie to make his telephone report. I make corrections of any errors in those telephone reports as soon as the register charts are received by me each week and then the reports are sent to the State Engineer. I personally visit the Sand Creek diversion at least 10 times in each irrigation season and make checks on the chart and the staff gauge and often make check ratings on the weir. At the time of those visits, if I find the register not operating correctly or the pen not recording properly, I make a (1519) notation on the chart, and I often make the notation on the chart showing it to be operating properly, if such is the case at my visit.

With reference to complainant's Exhibit 70, consisting of 9 automatic registering charts from the Sand Creek Ditch covering the year 1927, I find I made a notation on May 24th that at about 11:20 on that day I was at the [fol. 960] ditch and found the register working (1520) and marked it O. K. The notation appears as follows: "O. K. 5/24/27. McA." That notation is in my own hand writing. The line which appears across the record on that particular chart indicates that the float was working and that it was free. That line was probably made by me.

With reference to complainant's Exhibit 68, which is a series of 7 automatic register charts from the Sand Creek Ditch for the year 1925, I find a notation on the chart of May 16th, 1925, that the register and staff gauge showed a difference of .5 of a foot, and I think it is my initial, "McAnelly" and underneath (1521) ".5 of a foot", and I set it up to its proper place. The notations "5/16/25", "McA.", ".5" and "off" are in my hand writing, and refer to the date on which I made the notation and that the gauge staff and register differ, and indicate that I reset the pen to correspond.

Referring to Exhibit 69 and particularly to the notations made on the chart of May 29th, I find my notation to have been "Sat. P. M., .2 low", which indicates that the register was recording .2 of a foot below the staff gauge, and that it was corrected to its proper point. I set the pen at the proper point, taking into (1522) consideration the correction I had then made. It is impossible to make an exact

correction on a sheet where an error is found, because one cannot tell where the error started, but we always estimate as nearly as possible and believe we come reasonably close to the correct condition. In any event it is possible to check one chart with that preceding and to get a complete record through the season and determine the discharge. The reason for this is that the starting point of the new chart would be at the same point as that of the chart preceding it, so that there would be a continuous notation and record throughout the season.

With reference to the Bob Creek Ditch, the rating flume (1523) is a 6 foot rectangular flume, with a small Stevens automatic register, which, I believe, was placed in the ditch [fol. 961] in 1920, or at least it has been there ever since I have been Water Commissioner. (1524) The Stevens register is a mechanical device similar to that of the Bristol, except that the chart is oblong and is possibly a little more convenient than the Bristol to work from. This machine operates for 7 days and has a pencil which records automatically the depth of the water. This register is the same make as that in use by the Government and is a recognized standard. There has been a gauge reader at the Bob Creek Ditch until the present year, and there is none at this time because the ditch is not operating. The (1525) men who have been gauge readers at this ditch have been perfectly competent and reported to me the same as the readers at the other ditches, the report being received by me daily over the telephone and a weekly written report was sent me each Sunday. The register sheets were checked with the written reports, and if any discrepancies (1526) were found, they were immediately corrected. I base my written report to the State Engineer on the reports made from the charts and from the written report of the gauge reader.

With respect to the Columbine Ditch, there is a 3 foot rectangular rating flume with a Stevens automatic registering device installed. That ditch is not operating this season by order of the State Engineer of Colorado, and such order was given on account of the present controversy with the State of Wyoming. Heretofore the same telephone reports, charts and written report have been made with reference to the Columbine Ditch as I have just described

in connection with the operation of the Bob Creek Ditch. The automatic register at the Columbine Ditch was installed and operating in 1921 (1527) when I became Water Commissioner.

With respect to the Lost Lake System, that system consists of Lost Lake, Laramie Lake, Twin Lakes and Chambers Lake. There is a small Bristol automatic register in- [fol. 962] stalled at the outlet of Lost Lake used in connection with a 6 foot drop weir. The register operates in the same manner as the others described. The care- (1528) taker at Chambers Lake is the gauge reader for the Lost Lake System and he reports to me each day when the run is made from the reservoirs. The care-takers and gauge readers have been competent men and able to discharge their duties satisfactorily.

(1529) I recall of having had a conversation with Mr. Meeker with respect to the charts and automatic registers used in connection with the Laramie-Poudre Tunnel and possibly the Skyline Ditch. In that conversation Mr. Meeker asked for some specific charts and I informed him that I had burned them. I do not recall what particular charts were asked for nor do I recall with respect to any particular diversion. The circumstances were that I burned all of the accumulations that I had up to and probably including (1530) 1925. The charts were in my basement and were in such condition that they could be of no possible use, and I, therefore, burned them. I think the charts burned included those from the Skyline, Michigan, Grand River, Sand Creek and Bob Creek Ditches. Neither those of the Grand River, Michigan or Cameron Pass Ditches were or are in any way connected with this controversy. I do not recall just what period of time was covered by the charts which I destroyed, but in 1926 I was asked by the State Engineer for all charts I had on hand and all such were sent to that office. All the information the charts which I destroyed contained had been reported to the (1531) State Engineer in my various reports. My reports are an official record in the office of the State Engineer, and I keep a copy of all reports. When the charts were destroyed there was, so far as I know, no litigation pending in which the reports could have been of value, and at the time my weekly reports were the only official records required by law, and the law governing

delivery of the automatic charts for the State Engineer's records was not adopted (1532) until 1925. The first act in connection with the installation of automatic registers [fol. 963] on interstate streams was adopted in 1921, and those installations were for investigation purposes only.

For my own information I keep a record of daily diversions into and out of the Cache la Poudre River, and I have kept such a record since I first became Water Commissioner. It is my personal (1533) record, but I have never refused it to anyone. My first information that the State Engineer required that I send all automatic charts to him was received sometime in 1927. Prior to that time there was no request or requirement that these charts be sent to that (1534) office.

Reading Complainant's Exhibit No. 58, which is an automatic register chart of the Laramie-Poudre Tunnel for a period from July 13th to 20th, 1929, and particularly with reference to (1535) the entry on July 18th, I find the notation to read as follows: "9:30 A. M., J. H. B. Float raised by hand. J. H. B." This indicates that the register read .9 at 9:30 o'clock in the forenoon of that day, which corresponds with the staff gauge at that time. The initials J. H. B. are those of the Chief Hydrographer in the State Engineer's office for Colorado at that time, and the reading indicates that at the time of the notation the device was operating properly and that it was correct. The figures appearing on the chart which I hold show the mean gauge height for 24 hours. For instance, the figure 1.24 appearing on July 17th means the gauge height from 4 P. M. on the 16th to 4 P. M. on the 17th, and (1536) if Mr. Ralph I. Meeker in his testimony stated that the mean gauge height from the pen record of July 17th was 1.54 and that as a result of that computation there was "28 acre feet of unrecorded water for July 17, 1929", he was incorrect for the reason that if he had taken the next 24 hours on the same basis, he would have found the written mean gauge height a great deal more than he figured, or if he had [fol. 964] taken the whole sheet and figured it from the time of the change at 4 P. M. on Saturday to the time it was changed at 4 P. M. on the next Saturday, he would have gotten the same average which the sheet shows and which was written on the sheet. I also believe Mr. Meeker to have figured this particular sheet from midnight to mid-

night and that method is not advisable in view of the (1537) method used in delivery of water in this valley. In 1923, there were no automatic charts for the period from June 10th to June 18th, inclusive, for the reason that there were no diversions at that time through the Laramie-Poudre Tunnel. We had the biggest river that the Cache la Poudre Valley had known at that time, and I personally called the men at all of the mountain ditches and told them to cut all of the water out of the ditches and down its natural course, and for that reason no record was made and there were no diversions. The same situation applied for the period of June, (1538) 1924, and there were no diversions from the trans-mountain ditches.

The various trans-mountain diversions have all had automatic registers installed for more than 20 years to my own knowledge, and prior to 1925 there was no law in this state requiring those installations or that the records should be sent to the State Engineer's office. The registers were installed for protection (1539) of the owners of the various diversions and to convince the other users in District No. 3 that there was no more being credited than was actually being delivered from these several sources.

Cross-examination.

By Mr. James A. Greenwood:

(1540) I have never made a check meter measurement of the Venturi flume at the Laramie-Poudre Tunnel, and my information comes from the State Engineer's office and from Mr. Ralph Parshall. Mr. Parshall has made a great many check measurements of that flume and he has always turned his memorandum to me. I have seen rock and debris [fol. 965] lodged in the upper end of the flume quite often. The gauge reader at the tunnel has instructions to keep the rock and debris moving all of the time, and I make inquiry two or three times a week as (1541) to its condition. I would say that if the debris were permitted to lodge it would disturb the measurement. I understand the accuracy of the Venturi flume at the tunnel has been demonstrated by experiments at the College or on the river by the College authorities, but the approaches to the flume, I understand, in both cases have been in a straight section. I do not know of any experiments which have been made

where water approaches the flume after a right angle turn. The only tests that I know which have been made are of meter (1542) measurements at the mouth of the tunnel. With relation to the Sand Creek Ditch, I would say that I have always made more than one current meter test in each season to determine the accuracy of the measurements through that flume, and I keep a record of all those current meter measurements. So far as the Dead Man Ditch of the Wilson Supply System is concerned, I have nothing to do with the measurement of water that comes through that ditch as it is in District No. 48 and I have no jurisdiction in that district. My only duty is to receive water which is discharged from the Sand Creek or Wilson Supply System into District No. 3, where it drops into Sheep Creek. I know nothing whatever of the measurement of water or whether it is measured out of the Dead Man Creek into Sand Creek. (1543) My spot measurements of the discharge of the Divide ditch do not give any information as to how much water is from the so-called Dead Man Ditch into Sand Creek.

None of the gauge readers at the several trans-mountain diversions are State officials, although in so far as they are responsible to me for delivery of water they are under my jurisdiction. None of them work for the State nor are they paid by the State. Each (1544) of these men is employed by the company owning the diversion. When I say the men are under my jurisdiction in carrying out my in- [fol. 966] structions, I mean that is the only method by which the several companies may receive credit for the water which they deliver into District No. 3. An additional check on the correctness of the reports from the gauge readers and of the automatic charts is the check measurements (1545) made by other users of water in District No. 3. The field book or notes relate to Poudre River diversions only, but these trans-mountain waters are worked in with the Poudre River diversion. If there should be a diversion for a day or a week out of the Laramie River into the Poudre, and no record is furnished me as to the amount, the owner of the water could not get credit in District No. 3 for any water not reported, although the automatic register sheets might show some diversion through the ditch. The amount shown on the chart would be in the Poudre River, but it would not be a diversion to the owner, and

the owner would get no benefit from it. (1546) It is possible that water may have been discharged during the year 1933 in April before the automatic register at the tunnel was operating. This condition might exist on account of snow and ice accumulations so that the automatic register would not operate. I think, however, that the diversions are all reported on account of the fact that the owner wishes to get credit for the water as soon as possible. I (1547) never had any reason to doubt the reliability of the information sent me from the Laramie-Poudre Tunnel by Mr. Homer Duvall, and if he reported that in the fall or winter of 1925 and the early winter months of 1926 water was run through the tunnel which was not reported, I would rely on his statement.

The charts which I testified that I destroyed were automatic gauge charts and were the original records showing the various trans-mountain diversions during the period of time for which they were (1548) taken. I had checked those charts as they came to me, and the record which I keep is not an original record but is my private file. The State Engineer has the same information which I have, [fol. 967] except that the latter record is on the basis of weekly reports rather than daily. My first instruction to send the automatic charts to the State Engineer came in 1926 or in 1927 through a letter from that office.

In my judgment, an accurate meter measurement can be made of the flow above the Venturi flume at the tunnel, but it would (1549) require very careful work. It is not the ideal condition for making that sort of a measurement, but I believe that such measurement can be made with reasonable accuracy. I am in no way interested in (1551) the amount of water diverted through any of the trans-mountain ditches, and I have no interest in the aggregate diversions. My duties are solely the receiving and distributing the water which is turned into the Poudre River from these several trans-mountain diversions. As, for instance, in the year 1927 I made no attempt to have the diversions of the Skyline Ditch discontinued after the total had reached 18,000 acre feet. That was no part of my duty and I had no authority to make any such requirement. I give the company credit for the total amount of water each season which they discharge into the Cache la Poudre River, and my only interest is in seeing that the (1552) owner gets

the amount of water which it delivers. The same situation applies equally to the trans-mountain diversion known as the Laramie-Poudre Tunnel and to the Bob Creek Ditch. I made a map of the Columbine and Bob Creek Ditches from existing notes and I think that map was made sometime about 1921 or earlier.

I think water was first diverted through the Bob Creek (1553) in 1919 and from the Columbine in about 1920. The water has been delivered into the Poudre River and the delivery is made like all the rest of the trans-mountain diversions. Part of the time it is stored in reservoirs and part of the time it is run direct through the river. The water is delivered first to the class known as preferred stockholders of the Mountain and Plains Company, and if [fol. 968] there is any surplus, it may be sold by the company. I keep no record of the waters of the West Side Collection Ditch, except as such water may be delivered into my district through the tunnel. I have no knowledge of how much water is run through that ditch. (1554) So far as I know, the West Side Collection Ditch owns the water and the West Side Construction Company is probably owned by Mr. Moore and Mr. Evans. I did not testify that on account of conditions the trans-mountain diversions and particularly the Tunnel, Sand Creek and the Divide Ditch should have a new rating table practically every year. I did say we had such a rating on the Skyline nearly every year and when the old rating flume was used at the Tunnel, we (1555) had such a rating each year. I would say that a rating table should be checked at any ditch oftener than once in 10 or 15 years.

Redirect examination.

By Mr. Shrader P. Howell:

The gauge readers at the several trans-mountain diversions operate under my direction and reports are made to me as Water (1556) Commissioner of District No. 3. If incorrect reports were made or the work of the gauge reader at either of the ditches was unsatisfactory, the company making the diversion would be penalized by having its water cut off, and if the condition were not rectified (1557) immediately, that penalty would continue. In addition to the reports which I receive and the charts which

are sent me weekly, I make personal visits to the several diversion gates in the mountains several times each season, and I also get reports from various water users in District No. 3.

I have never seen the throat of the Parshall-Venturi flume at the tunnel other than free and open, and when I stated that I had seen debris in the flume, I meant that I had seen debris lodged in the upper portion of the flume. The throat is the control point in the measurement of water and it has always been clear.

[fol. 969] (1558) Recross-examination.

By Mr. James A. Greenwood:

I do not know whether the State Engineer of Colorado took any steps in 1927, 1928 or 1929 to prevent diversion of water through the Skyline Ditch in excess of 18,000 acre feet.

[fol. 970] C. L. Patterson, witness in behalf of defendant:

Direct examination.

By Mr. Shrader P. Howell:

(1559) I reside at Pueblo, Colorado and have lived in the State since 1889. My profession is that of a Civil Engineer. After completing the grade and high-schools at Pueblo, Colorado, I attended and graduated from the University of Michigan in Civil Engineering in the class of 1908.

(1560) I began working at my profession in the summer of 1900 being employed by Consulting Engineer H. K. Phillips, of St. Louis, in various capacities, including inspector, surveyor and assistant. I worked on the Combined Storm and Sanitary Sewer System, in Pueblo; the paving of South Union Avenue and Northern Avenue in Bessemer and the paving of Main and Commercial Streets in Trinidad, in which I had charge of the field party, as well as various investigations of projects designed to supply new water systems for the City of Pueblo and adjoining towns in the Arkansas Valley, Colorado.

In 1907, I was employed by the Central Colorado Power Company, as transitman and later in charge of field party

making a survey of Eagle Rock Reservoir site on the South Fork of the South Platte River, and also tunnel locations leading to the reservoir from North Fork of South Platte River. And tunnel location surveys for trans-mountain diversions to upper South Platte River Basin. After graduating, I was employed as a surveyor, in charge of field party, on trans-mountain diversion projects for the Arkansas River Basin; reservoir sites near Leadville, and an irrigation distribution system at Canon City. I also made some surveys and was in charge of construction work of an irrigation project at Fort Stockton, Texas, also some surveys and in charge of construction of a portion of the irrigation facilities of the Pueblo-Rocky (1561) Ford project, near Pueblo.

[fol. 971] From the fall of 1910, until the spring of 1916, I was employed by the Arkansas Valley Ditch Association, first as hydrographer and later as Assistant Engineer, and finally as Engineer for the Association. The Arkansas Valley Ditch Association, is an organization composed of about 20 of the large irrigation enterprises in the lower Arkansas Valley in Colorado, which together irrigate about 300,000 acres of land located from Pueblo eastward to the Kansas State line. This Association was created approximately in about 1902, and was named as defendant with the State of Colorado, in the original interstate case of Kansas vs. Colorado, filed in 1901, and decided in 1907. At the time of my employment in 1910, another interstate case had been filed by a group of irrigation interests in Kansas, and my work continued until 1916, when that case was settled by contract.

(1562) In the preparation of the defense of that interstate case I acted as hydrographer, measuring the discharge of the river and of its various tributaries, and the diversions of all the canals in both Colorado and Kansas, involved in that controversy. I prepared rating tables, established several new gaging stations, hired and instructed observers, and installed a number of automatic recording or registering devices. Later on, I attended to the office work of the Association and in that connection compiled all of the available records from the earliest date, relating to the water supply and its utilization in the Arkansas River Basin in Colorado and Kansas. This Association commenced issuing a report on the status of stream flows

and diversions, prior to 1910, and during my employment these were expanded to cover more stations and were issued every day for the full year, instead of periodically during the summer season. Among the special investiga-
[fol. 972] tions carried on during this period from 1910 to 1916, were studies of losses and conveyances of water in ditches and in natural stream channels; the studies of the gross and net duties of water, and of the use and disposal of water in connection with its irrigation service. Also studies to determine the accuracy of early records; to ascertain the probable difference in various ways of measuring water in (1563) streams and ditches. Since 1916, I have been engaged in private practice as a Civil Engineer and have been employed as Consulting Engineer by the Arkansas Valley Ditch Association almost continuously since 1916. There have been three interstate suits; two filed by irrigation interests in Kansas and one by the State of Colorado, on which I have worked and in fact I directed the engineering activities of the Ditch Association in that connection. In general, my practice has dealt principally with water and water rights, although the field has somewhat expanded to include some little construction work and general and special investigations, not only of the use and disposal of water but the results and benefits arising from its use.

(1564) There has been very little irrigation construction in the Arkansas Valley since 1910. I designed and reconstructed several headgate works since the flood of 1921, and have investigated and reported on practically every irrigation facility in the River Basin, either in connection with some water supply investigation, or for the purpose of reports upon their financial or legal conditions.

I have designed structures such as dams, weirs, headgates, sand gates, flumes, pipe lines, and so forth for
[fol. 973] several individual enterprises and for the City of Pueblo, I designed and had charge of the construction of their new diversion weir and headgates at the South side plant, and have done all their engineering work for a number of years on the North side system, including a new treating plant, sedimentation basins, a new reservoir and several measuring and recording devices. I have also acted as Consulting Engineer in a number of special improvement projects, such as storm sewers and paving, sanitary sewers and drainage projects.

(1565) Much of my work -as had to do with studies with respect to financial or legal phases of irrigation, and the findings and opinions are embodied in reports, together with all the available data or records bearing on the questions involved. By "general investigations", I mean those more or less continuous, or year by year, of data which suggests or indicates the growth and development of agricultural operations in counties represented in the Association; the tabulation of acreage devoted to field crop production, population engaged in agriculture, amounts and values of crops produced and the values of the land so employed and such similar questions.

From these studies we attempt to ascertain the most beneficial methods, places, practices and characters of water utilization, and to learn of any adverse influence or injurious effects which may be taking place.

(1566) By the term "special investigation" I mean the study of some particular question or problem, in connection with some particular enterprise or area under consideration.

Our Association is interested in attaining the maximum values and stability of water rights, and to that end is interested in constructive legislation, the administrative practices of the State of Colorado, and all rulings made either by the administrative or judicial departments of the [fol. 974] State. My work includes the compilation of evidence bearing on the questions and in presenting the same to the attorneys and to the courts.

(1567) Most of my work has been done in the region of the Arkansas Valley in Colorado, although my investigations have included the upper river, and the tributary valleys of the Basin, and I visited other valleys in the State, did considerable work in Kansas, and made a few trips to other States, among which are the states of Utah, Idaho, California, New Mexico and Texas; in connection with my work, in a general way I am familiar with the hydrographic work carried on by the State of Colorado, and am quite familiar with the records relating to Irrigation Division No. 2, in Colorado. I have to refer to them and use them more or less constantly in my work. One of the records of stream flows and diversions which is being compiled by the Association is this daily report, and it is an official record, although it is compiled as a co-operative project. At other

times we carry out special investigations that are co-operative with the State Engineering Department. These records, both private and public, are official and form the basic data upon which most of my studies are based.

(1568) In connection with the question of determining the extent of irrigated acreage there are several different sources of information and one might get several different answers from them. Among the public agencies that report this data may be mentioned, first, the reports of the State Engineer; second, the reports of the County Assessors, published in connection with the Tax Commission, or the Colorado Year Book; Third, the Colorado crop reporting service; and, fourth, the Federal Census Bureau re-[fol. 975] ports. All of these are what may be termed official records, and for the purpose for which they are collected, are generally found to be accurate, and yet at considerable variance one with another. Sometimes these disagreements are due to self-evident errors appearing in the record, but as a rule the differences appear because of variations in the rules under which classifications are made and because of the different purposes for which the data is gathered, compiled and reported.

(1569) We do not find these various records or reports very convincing in attempting to determine the correct answer to the question involved in the study. Most of the confusion arises when attempts are made to prove a point from official records selected for that purpose. That is to say, the confusion arises not so much from the records as from their interpretations. What I mean, is the confusion arises out of the application of the record itself. There are both private and public records of water supply and diversions and there is often a variation or difference among them.

In the Arkansas Valley a certain canal employs a headgate man and he observes the reading of the gage, both on his canal and on the river station adjoining. This observer reports each morning to the company office and also enters his observations in his own note book. The same data is also entered (1570) in the company office on forms provided for that purpose. Here are the beginnings of two private records. The company also employs an engineer who is a capable hydrographer, and he makes meter measurements and prepares rating curves and tables

for both of these stations. From the data in his office he thus compiles a private record based on single daily gage [fol. 976] height observations and on private measurements, curves and tables. The observer at the headgate is provided with the same rating table and might compile a similar record of stream flow and diversion, and yet the two might, and very often do, differ, in this, that the effects of shifting channel conditions might be incorporated by the engineer, according to some recognized basis of adjustment, while the headgate observer might not undertake such a refinement. Similarly, the company engineer can prepare even a third series of notes or computations on that same station, for he receives the same automatic chart and can take off his data before sending it in to the water officials. These stations are also official rating stations and measured by the State hydrographers, and such tables are supplied by the company as well as the Water Commissioner of (1571) that district. At times, these rating tables differ from those prepared by the company engineer for private purposes yet both may be substantially accurate.

A headgate man also reports each morning to the Water Commissioner, who enters such reports in his book, and the Water Commissioner in turn reports each morning to the Division Engineer, and these reports so received are sent out and published each morning by the ditch association. That might be termed a second official report, because it is signed by an administrative official and may differ from the one signed by the Water Commissioner. These differences arise by error or omissions, or by incidental notations relating to one but not to the other record, or by using a recently prepared conversion table not as yet available to the other. At any rate, there is a third official record [fol. 977] created in the office of the Division Engineer. Finally, there is a fourth official record that is compiled in the State Engineer's office, based either on single staff gage readings, or on automatic charts, or on both together. In any event the compilation of data such as this always involves a personal element, some measure of judgment being necessary not only in creating the record, but in its interpretation.

(1572) Most of the confusion resulting from these differences and discrepancies in the several records or reports

arises when somebody uses one of these records, and because it is signed as an official document, he insists that it is therefore correct, and makes use of it for a purpose for which it was not prepared.

(1573) I became identified with the present suit, Wyoming vs. Colorado in May, 1933, at which time I was engaged by the State Engineer, M. C. Hinderlider, who told me that the State of Wyoming had challenged the accuracy of the Colorado records of diversions from the Laramie River and had alleged that such records were inaccurate, and that Colorado was violating the terms of the decree of the United States Supreme Court, as laid down in a former case. Mr. Hinderlider asked me to examine the records and study the facilities, devices, methods and practices under which the said records were compiled or created, with a view of ascertaining or forming an opinion on the matter of accuracy, and on the question of violation of the decree.

(1574) While I do not profess to have an intimate acquaintance with the Laramie River or the Laramie River Basin, still from my training and experience, and from observations and studies, I feel qualified to discuss the matters as outlined for me to investigate. The procedure which I followed in making the investigation was to first read the decree and the amended decree of 1922, the terms of [fol. 978] which are alleged to have been violated. I should say, I re-read it, for previously that decree had been read and reread many times by me and I have attended many conferences at which its terms and provisions were analyzed and discussed by the attorneys in the Colorado-Kansas case. I also briefly read the complaint in the case and the motions and rulings and the answer by Colorado. I have heard no evidence that has been presented by the State of Wyoming in the present case, but I have inspected certain exhibits offered by witnesses in behalf of Wyoming, which I reviewed by notes taken down by Mr. Tipton of the Colorado Engineering Department and I have not read the transcript, except such portions of the testimony of R. I. Meeker, the engineering witness for the State of Wyoming.

(1575) I attempted to form an opinion as to the amounts of water taken and used from the Laramie River and in this connection I have studied the several performance records of the transmountain diversion projects from the

year 1922, to and including the year 1932. In this study I considered circumstances both as to completeness and accuracy. There are two records available, generally speaking, to the state as to these transmountain diversions. One consists of the administrative reports of the Water Commissioner of District No. 3, whose duty it is to administer such transmountain water diversions to its proper owner within his district. With few exceptions his reports begin in the spring, when one might expect diversions of water to be possible at such altitudes, and they continue with but few lapses in the record, until such time as nature halts this diversion.

(1576) I am connected with five ditches making transmountain diversions bringing water into the Arkansas River Basin, and I have made some investigations and am [fol. 979] now carrying on others in connection with three rather larger projects of bringing water into the Arkansas Valley from the Colorado River Basin.

I find the reports of the Water Commissioner of District No. 3, during the period of 1922 to 1932, to be signed by W. J. McAnelly. Mr. McAnelly is one of the Deputy State Engineers, and he makes meter measurements and rating tables in connection with such diversions from the Laramie River Basin into his Water District. Because of this dual role, I am inclined to give his reports more than the usual weight given to Water Commissioner's reports.

(1577) There are two methods in general available for checking such reports, viz: one arises out of the conflict among the water users on the Cache la Poudre River, in which the owner is concerned with receiving a credit for all of the water that he brings over, or that he delivers into the Cache la Poudre, while the other claimants on that stream are active in preventing any over-credit which, if done, would deny them water to which otherwise they would be entitled. This form of check is not available to me, but I am aware that it does exist, but it is a very effective means of preventing any gross errors. The second check is available during most of the eleven years, although not all eleven of them. This check results from an examination of the automatic charts, and permits of determining the accuracy with which the gage readings are taken and averaged, and reported each day or week, and the accuracy with which the volumes have then been calculated.

There was another record available which aided in my investigation and this was the record of the meter measurements made by the employees and officials of the State of Colorado, which was in the records of the State Engi- [fol. 980] neer's office. From these I was able to prepare my own rating curve and table and in that fashion I was able to estimate the accuracy with which that phase of the work had been done.

In most of the years the automatic chart records were available and during the time when it was available, I used the (1578) automatic charts in the determination of quantities. In all such cases, or years, when the automatic charts records and commissioners' reports were available I made use of them. I was also able to supply the missing items in the Water Commissioner's reports from this automatic chart record which shows all the diversions regardless of their administrative status of the water. In those years for which no automatic charts were available, I have been forced to use the Water Commissioner's reports, having first checked them during all of the years when both forms of information were available and have found them to substantially agree. In all other years when but one record was available, the intervals when no administrative reports were found, had been supplied by estimate or interpolation. These periods or intervals for which missing data was necessarily supplied occurred very infrequently, and but for limited times so that a major error would result in only a minor variation in the total volume for the whole season. I first undertook to investigate the Laramie-Poudre Tunnel and found records available from the Water Commissioner's administrative reports for each of the years of the whole period, and also automatic chart records (1579) from 1926 to 1932, inclusive. I then worked up the data based on these automatic charts, and compared that record week by week, and month by month, with the reports of the Water Commissioner, and found them to be in substantial agreement. This relation justified a reliance [fol. 981] in the Water Commissioner's reports for the previous period from 1922 to 1923. For this period of four years, the weekly reports have been used by me, which have been supplemented, where necessary, that is, in two or three instances, by the estimates as I have previously mentioned.

Taking up the record year by year, and beginning with the year 1922, the Water Commissioner began reporting as of the 30th day of April, and his reports end with the 25th day of November, and are complete and continuous for each day of that period except for an interval in the fall, from September 10th to October 8th. My summation of these administrative reports shows that diversions reported each month, reduced to acre-feet quantities, aggregated the following amounts:

April, 22 acre feet; May, 1,380 acre feet; June 3,522 acre feet; July, 782 acre feet; August, 544 acre feet; September, 108 acre feet; October, 240 acre feet; November 250 acre feet; making a total for the year 1922 of 6,848 acre feet. As to this interval during late September and early October, the reports I examined were not entirely clear to me as to whether no diversion was made at all, or whether it came at a time that might be termed a free water period, and not credited to the company. In the interests of adequate estimates, where any are to be made, we have added 252 acre feet to the September reports, being 21 days at 6 second feet, and have added on 70 acre feet to the October reports, being 7 days at 5 seconds feet and thus have filled in and completed the record, making (1580) a total for the year of 7,170 acre feet.

The amounts that I have indicated are called by me "acre feet", technically, they are not. I aggregated the number of second feet and multiplied that by two, when strictly I should have multiplied by a fraction less than 2, or 1.98, and hence all the items that I will give as the amounts that [fol. 982] I computed will be approximately 1% above the true acre foot. In 1922 the old rating flume was in operation at the Laramie Poudre tunnel, and this was a standard rectangular flume 12 feet across, that had been built sometime prior to 1922, and which, apparently, had been measured or rated at various times and with various results. These several previous measurements and ratings were critically examined by me and while they indicate some tendency to variable and shifting conditions, still at the time the device was a standard device and the methods of its use were according to established practice or custom of compiling basic data on canal diversions. During the period that this standard type of rating flume was in service from

1922, up to May 20, 1927, when it was removed and replaced by a Parshall rating flume, there are no measurements which suggest that any rating table, other than the one prepared and used by Mr. McAnelly would have more nearly fitted the conditions and in my opinion his record may be relied upon as being substantially accurate.

(1581) In the year 1923 I found the discharge for the Laramie-Poudre Tunnel according to the Water Commissioner's reports which began April 17 and continued until September 8th, and were completed for each day of that period, except for an interval of 19 days in the month of June, aggregating 414 acre feet in April; 2,648 acre feet in May; 1,464 acre feet in June; 4,938 acre feet in July; 770 acre feet in August and 144 acre feet in September, a total of 10,398 acre feet for that year. I have not added any quantity or made any estimate for the interval of 19 days in the month of June, for the reason that I found after investigation that this interval of 19 days occurred at a time when there was a rather high flow in the Cache la [fol. 983] Poudre Valley, what might be termed a flood stage existing there and because of the fact that some of these other ditches were out at substantially the same time, I finally concluded that they actually were out and did not bring over additional water to add to these flood stages.

For the year 1924 I found that the Water Commissioner's reports, begin with May 12th and continue until November 8th. (1582) According to my summation they show a total of 4,390 acre feet of diversion, distributed as follows: In May, 1020 acre feet; June, 46 acre feet; July, 1364 acre feet; August, 690 acre feet; September, 1,000 acre feet; October, 200 acre feet; and November, 70 acre feet. There is a missing period in that year's record of substantially the whole month of June, and after investigation I concluded that there were no diversions in that month, because I learned that the company could have taken care of the water and needed the water and kept sending in reports as to all of these trans-mountain projects without mentioning the exact amount diverted by the Laramie Poudre Tunnel, so I finally concluded that in fact there were no diversions made for that period and I therefore made no additions to complete the record. In 1925, the administrative reports began in March and extend to December 12th, and are complete for every day with ex-

ception of three days only in September, and those figures I supplied by interpolation. They involve a very small quantity of water, but having supplied them, we compute the aggregate in acre feet as follows:

In March, 62; April, 928; May, 982; June, 2308; July, 758; August, 1240; September, 2084; October, 1424; November, 1170; December, 384, a total for that year of 11,340 acre feet.

(1583) The administrative reports for the year 1926, covering the period from May 5th to September 22nd, and they show a total diversion of 5,706 acre feet. I had avail- [fol. 984] able the automatic charts for that year which began and ended substantially the same time as above indicated. This automatic record is complete, except that I found one chart to be missing, covering the period of one week from May 15th to the 22nd. The chart record summarized by me, shows a total of 5,742 acre feet, and completing the record by supplying the missing data from the Water Commissioner's report for that week, brings the total to 6,118 acre feet for the year, which was distributed as follows: May, 1,950; June, 770; July, 1,350; August, 1,040; September, 998. In the year 1927 the administrative reports commenced on April 9th and extended to October 13th, so far as the Laramie-Poudre Tunnel is concerned, although some trans-mountain diversions were reported up to November 12th on other projects. These reports are kept for this entire period, with the exception of two days in May, when later I found that the ditch was out in order to permit of the construction of the new Parshall Rating Flume, and except for about a day or two (1584) in September, when the flow had substantially ceased.

These administrative reports, summarized by me, show an aggregate for the year of 7,751 acre feet. The automatic charts were also available and cover substantially the same period, and the chart record shows a total of 7,728 acre feet for the same period.

Plaintiff's Exhibit 60, which is a tabulated statement purporting to show disagreement in the diversion quantities at the Laramie-Poudre Tunnel, and alleging that the Venturi records are at wide variance with the current meter discharges. The exhibit lists 13 meter measurements [fol. 985] on file in the office of the State Engineer of Colo-

rado, and of this number there are five which are claimed to indicate errors approximating 6 second feet, a percentage of error ranging from 12½% to 56%. I have analyzed these five measurements as well as others shown on Complainant's Exhibit 60, and it will be noticed first, that the first three of these meter measurements were made within a very few days after the installation of the Parshall rating flume. The fact that the State Engineering Department had a representative there at once after the Parshall flume was installed and made meter measurements, suggests alertness and must be construed to obtain or (1585) insure accuracy of the measuring device. And, further, as to these three measurements, I found a note added to the automatic chart, June 16, 1927, which was some three weeks after the meter measurements had been made, to the effect that a correction had been made in the staff gauge setting, and the chart shows on its face that this correction involved the raising of the gauge, so that the readings were reduced .16 of a foot. This correction would, therefore, apply back to the date of May 21, 1927, when the flume was installed and when the gauge rod was then wrongly established, and would apply to the pen record drawn on those charts, as well as to any meter measurements that might have been made in that interval. In other words, the correct gauge readings at the time these first three measurements were made, were .16 of a foot less than is shown on the other chart by the automatic registering device. For the first two of these tests, the corrected staff gauge becomes .92 feet, and at that stage the Parshall rating flume table shows a discharge of 21.01 second feet. The difference, was actually .5 of one second foot, and was not 6.62 second feet, and expressed in percentages the dif- [fol. 986] ference was approximately 3%, and was not 32%, as shown on Exhibit No. 60. The difference of 3% is a usual occurrence, and may be expected in any type of water measurement.

This second test on Complainant's Exhibit 60, being a (1586) second one dated May 24, 1927, in which is shown the meter discharge of 20.98 second feet, checks almost exactly the Parshall flume table, the error in this case being only .03 of a second foot and not 6.15 second feet, as alleged, and the percentage being .15 of one per cent, and not 29% as disclosed on the exhibit. The third meas-

urement, dated May 25, 1927, shows a meter discharge of 8.33 second feet and when compared to the Parshall rating table for the corrected chart reading of .52, being the .68 less .16, of 8.46 second feet, indicates a difference of only .13 of one second foot, which is about 1½%, and is not 56%, as purported to be shown by Complainant's Exhibit 60.

(1587) The fourth of this group of five tests shown on Complainant's Exhibit 60, is the measurement of July, 1932, by Hinderlider and Parshall. It will be noted that we have skipped over all of the years from May, 1927, to July, 1932, without finding any variances of large extent. From July, 1932, there is also another measurement, which is the 5th of this group of five, dated July 15th, made by Hydrographer Whitten, which is claimed to show an error of 12½%. I looked at the field notes of all the meter measurements shown on Exhibit 60, and in connection with this one of July, 1932, by Hinderlider and Parshall, the meter notes show that the date was July 5th, and the notes mention gravel deposits above (1588) and in the approach section of the flume. The notes further show that during the time of measurements there was an increasing gauge reading. The notes also indicated that only the velocities at the surface or at the 0.2 point were measured, and if the [fol. 987] measurements were computed under those conditions it would be natural to find an indicated discharge in excess of the true amount, for the reason that surface velocities are actually greater than average. In any event this particular measurement is itself open to question. The other one made July 15, 1932, by Hydrographer Whitten at a chart gauge reading of 1.54, and a meter discharge of 54.59 second feet. The notes indicate that this measurement was made at the West or entrance portion of the Laramie-Poudre Tunnel, which is a considerable distance in both miles and time away from the point of reading the gauge. The Hydrographer recognized this situation and shows on his notes that the gauge reading was 1.54, followed by a question mark, but that question mark was not reproduced on Exhibit 60. The Hydrographer further explains that the gauge height is only approximately and in my opinion under those conditions any one might under or over-estimate the time interval, and not be certain that the water measurement was the same flow that produced

the chart (1589) reading. Certainly such a measurement cannot be considered a test, and should not be used to create a new rating table, or condemn an old one.

Complainant's Exhibit 60 attempts to combine two factors into one calculation. The question to be answered from the information is as to the accuracy of the diversion record, and in my opinion both of the two factors must be stated separately and not together in order to ascertain the nature or extent of the variations. The exhibit shows the chart gauge height in feet. The first question, or factor, relates to the accuracy with which the automatic register indicates the actual staff gauge.

[fol. 988] These staff gauge readings appear on the meter field notes, and a comparison is thereby made possible. Running through the list of measurements on this basis, the automatic chart readings, in connection with the first two measurements, being those dated May 24, 1927, by M. C. Hinderlider, I have already discussed from the standpoint of the correction of .16 feet in the gauge. With this correction, the chart reading would be .92 feet, which is exactly the corrected staff reading as taken from the notes. The third measurement, dated May 25, 1927, with a chart gauge height of .68 feet, similarly, is subject (1590) to this .16 foot correction and becomes .52 feet. The meter notes show that the staff reading was .66 feet, which diminished by .16, becomes 0.50 feet, thus indicating a difference of .02 of a foot. The fourth measurement shown on Complainant's Exhibit 60, by J. H. Baily, dated September 26, 1928, I was unable to find the field notes in connection with it. I did find the notation in the file that no measurements had been made in 1928, or something to that effect. In any event, no great variance was indicated by the staff gauge height in connection with that measurement. The fifth one on the exhibit, being the measurement dated August 3, 1929, shows a chart gauge height of .53 of a foot, and the meter notes show that the staff gauge reading was .54 of a foot, the difference in this case being .01. The sixth measurement, being one by J. H. Baily and dated May 20th, 1930, shows a chart gauge reading of .65 feet, and a staff reading of .66 feet, the difference in this case being .01 of a foot. The seventh one, being the measurement made by J. H. Baily, dated July 4, 1930, shows a chart gauge reading of .59 feet, and a staff read-

ing of .60 feet, again the difference being .01 of a foot. The two measurements of July, 1932, cannot be checked [fol. 989] in this fashion since the exhibit gives no chart reading for one of them, and the meter notes give no staff readings for the other. I have previously discussed these two measurements. The next measurement in that group is dated June 18, 1932, by C. E. McGraw. This (1591) measurement shows a chart gauge height of 1.87 feet, and the meter notes show a staff gauge reading of 1.86 feet, a difference of .01 feet. The Burgess measurement, dated August 15, 1932, shows a chart gauge height of 1.21, and a staff reading of 1.19 as disclosed by the meter notes, the difference being .02 of a foot. The Whitten measurement of September 5, 1932, shows gauge reading of .91 feet, and a staff reading of .90 feet, again a difference of .01 of a foot. The last measurement of this list by Whitten, dated September 22nd, 1932, shows a chart reading of .67, and a staff reading of .64, in the case the difference being .03 of a foot.

In determining these chart and staff readings, the chart readings in every instance, are taken from Complainant's Exhibit No. 60, and the staff readings in each instance are taken from the hydrographer's field notes on file in the State Engineer's office at Denver, which were made at the time of the meter notes referred to in Complainant's Exhibit No. 60. In my opinion the check made indicates an excellent record from the standpoint of accuracy of the automatic devices. Of the ten comparisons made possible by the data of Complainant's Exhibit 60, one of them shows a variation of .03 feet, two of them show a variation of .02 feet, five of them check within .01 of a foot, and two of them check exactly. Out of the eight variations or differences, three of them were minus, meaning that the charts [fol. 990] then indicated somewhat less than the staff (1592) reading, and five of them were plus quantities. Such differences are not only small and to be expected, but they tend to balance one another.

This is a check not only of the accuracy of the instrument, and of its installation, but on the care with which the observer set the needle on the chart, and if all these measurements showing these minute variations are employed in connection with the reading of the record from the chart it lends a great deal of weight to the accuracy

of the record of each week when these measurements were made. In order to read the hundredths of a foot on the chart, it is necessary to do that by estimation, since the distance between the lines on the chart are only one-tenth of a foot. Any two experienced observers might vary one or two, or at times as much as .03, in determining what the pen line actually did read.

(1593) A second factor that I have previously mentioned is the question of volume of flow as measured by the current meter and as compared with the volume of flow as indicated by the standard Parshall rating flume. In such comparison, both must necessarily refer to the staff gage reading which is the only fixed element, and at the Laramie-Poudre Tunnel the official staff gage is located in the still-well.

I have already discussed the first three, being those made by Mr. C. Hinderlinder in May of 1927, of the list of measurements shown by Complainant's Exhibit 60, and I have shown the actual variations were very small, that is, less than one-half second foot, instead of approximately 6 second feet, as shown on Exhibit 60. As I have stated before, I could not find the field notes as to the Baily measurement in 1928. Proceeding from that point, then, there is the meter measurement of August 3, 1929, showing a meter [fol. 991] discharge of 9.65 second feet, for which the staff reading was .54 feet, and for which the staff reading, the Parshall standard flume table, indicated a discharge of 8.98 second feet. The difference in this instance is .57 of a second foot, which is less than 6% and not more than 9%, as shown by Complainant's Exhibit 60.

(1594) The next meter measurement on Complainant's Exhibit is the one dated May 20, 1930, showing meter discharge of 13.16 second feet. This was made when the staff gage read .66 feet, and the Parshall flume table shows the discharge at that height to be 12.38 second feet, the difference in this case being .78 second feet, or less than 6%.

The seventh measurement, dated July 4, 1930, shows a metered discharge of 11.50 second feet, and was made at a gage height of .60 second feet, at which gage height the Parshall flume table shows a discharge of 10.63 second feet, a difference of .87 of one second foot, or about 7½%.

The July, 1932, measurements I have already discussed. The McGraw measurement of June 18, 1932, admittedly checks the Parshall flume table amost exactly.

The Burgess measurement of August 15, 1932, showing a metered discharge of 30.04 second feet, was made at gage height of 1.19 foot, for which the Parshall flume table shows the volume to be 31.68 second feet, indicating a difference of 1.64 second feet, which is 5½%, and not 8.3%, as might be inferred from Complainant's Exhibit No. 60.

The Whitten measurement of September 5, 1932, shows a metered discharge of 19.52 second feet, the gage height being .90 feet, at which gage height the Parshall flume table shows the volume to be 20.29 second feet, a difference of .77 of one second foot, or about 4%.

[fol. 992] The last test on the list being that made by Hydrographer (1595) Whitten on September 22, 1932, shows a meter discharge of 11.76 second feet, the gage height being .64 second feet, and the discharge as shown by the Parshall flume table is 11.78 second feet, the difference being only .02 of one second foot. This alleged error of 7.8% in connection with the last measurement, was, in fact, due to the differences of only .03 feet, by which the chart reading then diverged from the staff reading. This slight division did result in a computed error of only 8%, when, as a matter of fact, the meter measurements checked the Parshall flume table almost exactly, and those deviations on the automatic chart were compensated; there are just as many below as were found above. I should say that a check test having a variation of one second foot, or a variation of five per cent, is a pretty good test, and this is particularly true in the measurement of small volumes, such as 5 to perhaps 20 second feet, necessarily made in shallow channels. I have found that where one is forced to employ .6 method of meter measurement, the variations up to 10% are about as good as a hydrographer can check his own work. Of course, as the con- (1596) ditions for rating improve, that is, the depths increase, so that the 2-8 method can be employed and so that the velocities are not excessive, an error of 10% under these conditions on a flow, say of 100 second feet, would be considered a very poor measurement with those conditions, and a person ought to keep within 3%. I have carried out tests to determine the accuracy of the formula, on the Parshall flume table, both by meter measurements, and by checking against a known calibrated weir. Based on my experience of a number of Parshall flumes of various sizes, some larger and smaller, and a few exactly the same size as the one at the Poudre

Tunnel, all of which were operating under a wide variety [fol. 993] of field conditions, I am satisfied that the device having once been properly installed will register a true volume of discharge, consistently, accurately and under all circumstances, so long as free flow conditions are maintained, or allowable degree of submergence is not exceeded. As to the Parshall flume at the (1597) Laramie-Poudre Tunnel, I consider that its installation since the gage was corrected in June of 1927, is entirely proper. As installed it is wholly free from any danger of submergence, or of any influence resulting from downstream depositions, or restrictions to the channel. It is my further opinion that no natural disposition of debris is possible within the throat of the Parshall flume, which is the critical governing section, so far as determining discharge quantities are concerned. Any particle, such as a rock, which can be moved by the current of the upstream channel, or velocities will keep on moving through the throat, by virtue of the accelerated velocities in that narrowest section. My inspection and observation of the Parshall flume at the Laramie-Poudre Tunnel was concerned particularly with two features, namely, the effect of upstream depositions, and the effect of the bend or curve or abrupt change in direction, which takes place from forty feet, or so, upstream from the flume. This bend or curve in my (1598 opinion is fortunate for it tends to arrest the extremely high velocities of the water as it emerges from the Tunnel. From this point down to the flume, the flow conditions, as I have stated, are disturbed, but in spite of this upstream turmoil, the flow of the water is restored to normal conditions by the time it reaches the throat of the Parshall flume. For this reason the upstream depositions, as well as this curve, or bend do not impair the accurate functioning of the device.

I have an entirely different reaction and conclusion from that which appears on this phase of the interpretation of [fol. 994] complainant's Exhibit No. 60. In my opinion it does not show divergences, and wide variations and disagreements, but, on the contrary, I feel that the information itself indicates that this Parshall flume for the entire period since it was installed, in 1927, with the possible exception of one month, July, last past, has made a consistently accurate record of the discharge of water from that Tunnel.

I have heretofore given my findings with reference to the record of discharge of the Laramie-Poudre Tunnel from and including the years 1922 to 1927, and referring now to the year 1928, I find that the administrative reports of the Water Commissioner extend from April 10th to October 9th, 1928, and are complete for each day of that period, except for an interval of ten days in the month of September. For that interval the automatic chart shows that there was (1599) no discharge. My summary of these reports of the Water Commissioner shows a total of 10,260 acre feet for the year. The automatic charts cover the same period, and show, according to my computations a total of 10,482 acre feet, being distributed as follows: 302 feet in April; 2810 acre feet in May; 4436 acre feet in June; 2186 acre feet in July; 302 acre feet in August; 256 acre feet in September and 190 acre feet in October. This is all for the year 1928.

In the year 1929, both the automatic charts and the administrative reports covered the period from May 9th to October 25th. My summation of the administrative reports shows a total of 8895 acre feet, and my computations and summations from the automatic charts shows a total of 8975 acre feet. This quantity was diverted in the following amounts, by months as follows: May, 1463; June, 3400; [fol. 995] July, 2066; August, 420; September, 282, and October 1344. For the year 1930, both the administrative and the chart records cover the period from May 5th to August 20th. The administrative reports summarized show a total of 3081 acre feet. The automatic chart shows (1600) total of 3024 acre feet, distributed by months as follows: May, 652; June, 1330; July, 614; August, 428.

For the year 1931, extending from May 25th to August 27th, the administrative reports summarized by me show a total of 2886 acre feet. The automatic chart shows 2922 acre feet, which is distributed by months as follows: May, 216 acre feet; June 1440; July, 886 and August, 380.

For the year 1932, the diversions through the Laramie-Poudre Tunnel, according to the record which extends from May 11th to October 11th, the administrative reports as summarized by me, show a total of 13,577 acre feet, while the automatic chart record shows an aggregate of 13,762 acre feet, distributed by months as follows: May, 1872 acre

feet; June, 5416; July, 3188; August, 2076; September, 986; October 224.

(1601) Summarizing and giving the totals of the diversions made by the Laramie-Poudre Tunnel for each of the years 1922 to 1932, inclusive, shows the following quantities in acre feet: In 1922, 7177; 1923, 10,398; 1924, 4390; 1925, 11,340; 1926, 6118; 1927, 7728; 1928, 10,482; 1929, 8975; 1930, 3024; 1931, 2992; 1932, 13,762, all in acre foot quantities, as previously described by me, being approximately one per cent in excess of true amounts.

(1602) I have averaged the discharge of the Laramie-Poudre Tunnel for the period of 1922 to 1932, and the average for this eleven year period is 7847 acre feet. I have made a similar analysis of the reports of the Skyline Ditch, in the same manner which I pursued with respect to the [fol. 996] Laramine-Poudre Tunnel. The period is from 1922 to 1932, inclusive. There were available in making this analysis the administrative reports of the Water Commissioner, McAnelly, for each of the eleven years, and also the automatic chart records were available for ten of the eleven years, being all the years except the year 1922. These reports were found in the office of the State Engineer of Colorado. The administrative reports of the Water Commissioner, McAnelly, shows the average flow by the week of all water that has been brought into his water district by each of these trans-mountain projects in which I was investigating and these also show the place and the amount to which that water was administered in the Cache la Poudre Basin.

(1603) On the Skyline Ditch the measurements were made and the gage heights were observed on a standard rectangular rating flume which is approximately 12 feet wide, and the record of discharge of the Skyline Ditch is compiled from the data at that flume.

The Water Commissioner's reports for the year 1922, show the diversions for the period May 20th to December 8th, and the reports cover each day of that time, except for one interval in September. The reported total, as summarized by me, aggregates 16,208 acre feet, and to this sum I have added an amount being interpolated quantity of 200 acre feet, thus arriving at a total for the year 1922 of 16,408 acre feet. As no automatic charts were available in 1922, and since the administrative reports have been

checked against the automatic charts for the remaining year and found to be in substantial agreement with the automatic chart records, I have accepted the reports of the Water Commissioner as representing the conditions prevailing in 1922.

(1604) In 1923 the administrative reports covered from May 22d to October 31st, while the automatic charts began May 19th and ended September 15th. Thus there is a period the latter part of that season which necessitates [fol. 997] the use of reported quantities and these are available for the interval October 14th to October 31st. Summarizing the reports of the Water Commissioner, I found a total of 16,228 acre feet, and summarizing the automatic chart records, there is a total of 16,582 acre feet. To this latter amount I have added 358 acre feet, being the amount reported by the Water Commissioner, but not shown by the chart record, and with this addition the year's total becomes 16,490 acre feet.

In the year 1924 there were diversions of the Skyline as shown by administrative reports of the Water Commissioner, as summarized by me, showing a total of 10,004 acre feet. The automatic charts for this year show 4,442 acre feet. This automatic chart record is incomplete, the charts are missing, except for the two months of May and June. I have, therefore, supplied this missing information from the reports of the Water Commissioner, and with this addition the year's total becomes 13,376 acre feet.

For the year 1925 the Skyline diversions, as reported by the Water Commissioner, and summarized by me, show a total of 15,094 acre feet. The automatic chart record shows an aggregate (1605) of 15,005 acre feet.

For the year 1926 the administrative reports show 17,096 acre feet for the year, with ten days unreported in the month of June. The automatic chart record, as summarized by me, shows a total of 18,903 acre feet, and this includes the period unreported by the administrative officials.

In 1927 the Skyline Ditch diversions, according to the Water Commissioner's reports, summarized by me, show a total of 22,166 acre feet. The automatic chart record shows an aggregate of 21,883 acre feet. The Water Commissioner for this season reports certain small flows late in the season, which are not shown on any automatic chart

[fol. 998] records, which appear in the months of October and November, when ice conditions and freezing may possibly have prevented any record being compiled by an automatic device. At any rate, I added these amounts reported by the Water Commissioner to the amounts shown by the automatic charts, thus completing the record for the season and I find a total of 22,338 acre feet.

In the year 1928 the Water Commissioner's reports show a total of 19,396 acre feet, and in that season the automatic chart record as worked up and summarized by me, shows a total diversion of 19,399 acre feet.

(1606) In 1929 the Water Commissioner's reports show an aggregate of 24,362 acre feet, and the automatic chart record shows a total of 24,689 acre feet.

The administrative reports for 1930, show a total of diversions by the Skyline Ditch of 19,010 acre feet and my summation of the automatic chart record shows for the same period a total of 18,388 acre feet.

The Water Commissioner's reports for 1931, show a total of 14,032 acre feet, while the automatic chart as summarized by me shows a total of 13,772 acre feet.

The Water Commissioner's reports show for the year 1932, a total diversion by the Skyline Ditch of 18,650 acre feet, while the automatic chart record summarized by me shows an aggregate of 18,139 acre feet. I should state again that the quantities here given are approximately 1% above the true acre foot amounts, due to my method of multiplication, where I used the factor of 2, instead of the exact decimal of 1.98. This figure in here perhaps was used merely as a matter of convenience.

[fol. 999] (1607) Summarizing the total yearly diversions as made by the Skyline Ditch from 1922 to 1932, inclusive, they are as follows, expressed in acre feet quantities:

For the year 1922, 16,408; 1923, 16,940; 1924, 13,376; 1925, 15,005; 1926, 18,903; 1927, 22,338; 1928, 19,399; 1929, 24,689; 1930, 18,388; 1931, 13,772; 1932, 18,139; the eleven year total being 197,357 acre feet, or an average for the eleven year period of 17,941 acre feet having been diverted by the Skyline Ditch.

I found four other enterprises diverting from the Laramie River Basin, namely: the Sand Creek, Bob Creek, Columbine Ditch and the outlet of Lost Lake.

I found records and reports of Water Commissioner McAnelly, in the office of the State Engineer for Colorado, concerning the Sand Creek Diversions for each of the years 1922 to 1932, inclusive. The automatic chart record for this ditch was also available for all of the years for that period, except that of 1922, giving a total annual diversion for Sand Creek Ditch, as ascertained by me from the records of the State Engineer's office in Colorado, they are as follows:

For the year 1922, 3234 acre feet; 1923, 4978; 1924, 1788; 1925, 4248; 1926, 2596; 1927, 3428; 1928, 1306; 1929, 5560; 1930, 2854; 1931, 2209; 1932, 5037, or an average for the yearly period of 3,385 acre feet per year.

(1608) With respect to the diversions made by the Bob Creek Ditch, I did not find any automatic charts and therefore relied upon the administrative reports of Mr. Mc-[fol. 1000] Anelly. I have added the quantities of water which may have been diver-ed each day when there was a lapse in the record, that is when no reports were found. These intervals and additions occurred in the years 1923, 1928 and 1931, and were a comparatively small amount.

I found the Bob Creek diversions, annually, in acre feet were as follows: 1922, 512 acre feet; 1923, 1652; 1924, none; 1925, 745; 1926, none; 1927, 1033; 1928, 750; 1929, 1124; 1930, 634; 1931, 691 and 1932, 842, or an average of 726 acre feet per year.

(1609) I would like to qualify my statement just made to the effect that I found no automatic charts for the Bob Creek Ditch. I inquired in Mr. Tipton's office, but did not continue my inquiries in the office upstairs of the State Engineer, and they may have been on file, but I did not make sufficient search to find them.

Referring to the records showing diversions made by the Columbine Ditch, I found the administrative reports, but did not make sufficient inquiry or search for the automatic records, so am giving my reports based on reports of Mr. McAnelly, augmented by estimates during such intervals when no reports were found in that file. These small additions were made in the years 1923, 1925 and 1928, and are purely estimates, and of comparatively small amounts. With those additions, and based on that record, the diversions of the Columbine Ditch, as summarized by me, are as follows:

In the year 1922, 181 acre feet; 1923, 439; 1924, none; 1925, 287; 1926, none; 1927, 396; 1928, 561; 1929, 592; 1930, 158; 1931, 212; 1932, 176, thus making an average of 273 acre feet per year.

[fol. 1001] In connection with the diversion by the Lost Lakes, I found automatic charts for the years 1927 to 1931, except for the year 1928, and I found some administrative reports of the Water Commissioner for the year 1926. According to these reports the aggregate annual diversions by the Lost Lakes, expressed in acre foot, as summarized by me, were as follows:

In 1922, 448 acre feet; no reports were found for the years 1923 to 1925, inclusive; 1927, 81 acre feet; based on chart record; 1929, 470; 1930, 231; 1931, 106; the average being (1610) 121 acre feet per year.

I have summarized the annual diversions of these four minor ditches, namely, Sand Creek, Bob Creek, Columbine and Lost Lake outlet, and the sum of the diversions expressed in acre feet made by these four ditches for the years indicated, is as follows:

1922, 3,927; 1923, 7,069; 1924, 1,788; 1925, 5,280; 1926, 3,044; 1927, 4,938; 1928, 2,617; 1929, 7,746; 1930, 3,877; 1931, 3,218 acre feet; 1932, 6,055 acre feet; the average being 4505 acre feet per year.

Of this average of the aggregate amount diverted by these four ditches, namely, 4,505 acre feet, the portion diverted by the Sand Creek Ditch was 3,385 acre feet per year, or 75% of the total diversions made by all four of these ditches.

The aggregate of all six of the projects taking and using water from the Laramie River Basin, including Sand Creek by means of trans-mountain diversions expressed by years and in acre feet are as follows, according to my summations.

In the year 1922, 27,512; 1923, 34,407; 1924, 19,554; 1925, 31,625; 1926, 28,065; 1927, 35,004; 1928, 32,498; 1929, 41,410; 1930, 25,289; 1931, 19,912; 1932, 37,956; the average [fol. 1002] being 30,293 acre feet.

(1611) My answer to this question is not strictly correct for the reason that Sand Creek has been declared to be a separate stream basin, and not a tributary to the Laramie River. To answer your question relative to the Laramie River proper, the diversions for the Sand Creek Ditch

should be deducted from the totals I have given, because of the nontributary character of Sand Creek and the portion obtained from Deadman Creek, because of the prior allocation in general terms as to that source and making the deductions of the Sand Creek discharge gives the following totals, namely:

In the year 1922, 24,278 acre feet; 1923, 29,429; 1924, 17,766; 1925, 27,377; 1926, 25,469; 1927, 31,576; 1928, 31,-192; 1929, 35,850; 1930, 22,435; 1931, 17,703; 1932, 32,919, making an average for the eleven year period of 26,908 acre feet per year. For other reasons which I have heretofore detailed these figures are approximately 1% in excess of the true acre feet quantities.

(1612) During all the years 1922 to 1932, both inclusive, the aggregate diversions by means of all trans-mountain diversion projects from the Laramie River and its tributaries, did not in any of those years exceed 33,500 acre feet of water except for the year 1929, when the aggregate of all diversions exceeded the amount of 33,500 acre feet by a very small quantity. Altogether all of the combined diversions of the Laramie River and its tributaries have diverted about 80% of the 33,500 acre feet quantity just mentioned.

I have read most of the testimony given by Mr. Ralph I. Meeker, who has heretofore testified for the State of Wy-[fol. 1003] oming in this case, and have noted particularly his comments and criticisms made of the measuring devices installed on these trans-mountain diversion ditches. To summarize his comments briefly, he states that there were two flumes in operation during the period of 1922 to 1932, and he says neither one of them was satisfactory. The first device is the one in service in the year 1922, which was a standard rectangular flume which had been installed sometime prior, and which thereafter was replaced in May, 1927, by the Parshall flume now in service. As to the first standard rectangular flume, three rating tables were found, which had been prepared, the first one dated Jne 1, 1918 by Hydrographer Wortham, who described the conditions when he made his measurements of the water, as good. The second (1613) table, dated July 4, 1920, prepared by R. G. Hosea, dated July 4, 1920, prepared by R. G. Hosea, described the conditions at the time he made his

measurements, as very poor and this was selected by Mr. Meeker as the principal basis of his comment. The third table, dated June 13, 1924, was prepared by Water Commissioner, and Special Deputy State Engineer McAnelly. He described the conditions at the time he made his measurements of water, as fair. All these water measurements and tables were made in connection with the same standard rectangular rating flume. The conditions in connection with the Parshall flume at the outlet of the Laramie-Poudre Tunnel are such that the meter measurement of water at that site cannot be made at all times and under all conditions, excellent or good, and without question there was evidence in connection with this first standard rectangular flume, of shifting conditions, in spite of check measurements made by Mr. McAnelly in the years 1925 and 1926, [fol. 1004] which so closely checked his rating table of the year 1924, that no new table was prepared or required, and still in 1927, the Parshall flume was installed. Certainly people who were responsible for the installation of this new Parshall flume in my opinion should be credited for at least attempting to compile a more accurate and reliable record.

(1614) The first Parshall flume installed in the Arkansas Valley according to my information was late in the summer of 1927, and this flume had been installed at the Poudre Tunnel outlet, about May 20th or 21st, 1927. As I have read the evidence of Mr. Ralph I. Meeker, who has heretofore testified as an engineer on behalf of Wyoming in this case, his objections to the new Parshall flume as installed at the Poudre Tunnel are upon the ground that it was located elsewhere than on a straight channel and that such location together with sand and gravel deposits prevents its accurate measurement of water. In my opinion, based upon investigation of dozens of installations and what probably might be said to be hundreds of practical tests, the Parshall flume is an excellent device for the

(1615) measurement of stream flow. As to the installation of this measuring device at the Poudre Tunnel, there was an error made in its original setting in connection with that gage. I can understand how such an error was made, because I have made them twice myself, and I thought I knew how those devices should be installed, however, the error was soon discovered and corrected, and the evidence

of the test measurements discloses that it has not again occurred. The correction due to the error in installation was made on June 16, 1927, approximately three weeks [fol. 1005] after the device was installed. The site where the installation has been made was created by nature and it is high up on a mountain side and straight sections on any of these mountain ditches are rarely available, and in spite of disturbances due to deposits or bends above the point of installation, the device itself works under the conditions prevailing there.

(1616) While this sand, gravel and rock that comes out of the Tunnel is unfortunate, the final test of the performance of that whole device is the record that it has produced which is satisfactory. To satisfy myself on that point I have examined a considerable number of test measurements which had been made at the outlet of the Poudre Tunnel. In addition to the 13 tests mentioned in complainant's Exhibit 60, and previously discussed by me, I have examined others, particularly the current meter notes of Mr. Parshall and Mr. Rohwer of the United States Department of Agriculture, and I have witnessed the making of meter measurements at that site by Mr. Potts and Mr. McGraw. These meter measurements tend to confirm my opinion that the record, as compiled by the Parshall flume and the Parshall table is a correct and accurate record, giving results well within the allowable errors inherent in the science or art of measuring discharges and recording volumes of flow.

My study and investigation shows a remarkably uniform agreement with the Parshall table in practically every instance where the meter test was carefully and properly made, and was referred to the correct gage. This means that the record compiled all during this period, based on this Parshall rating table verified as to the accuracy of that table in the manner I have described, may be accepted as an accurate record.

[fol. 1006] (1617) As I recall the testimony of Mr. Ralph I. Meeker, he made no major criticisms in respect to the devices used and records resulting with respect to the Skyline Ditch. His major effort was directed to the Tunnel and to the Sand Creek Ditch.

The Skyline measuring device is a standard rectangular flume, similar in size and type to the one replaced in 1927,

at the Laramie Poudre Tunnel. It is equipped with standard automatic registering device and located on as nearly a straight section of the ditch as could be found. The repeated meter tests of this flume show that periodically sand accumulates in it, but in spite of these shifts in the discharge conditions, the record may be termed fairly good.
(1618) The criticisms made by Mr. Ralph I. Meeker in his testimony with reference to the Sand Creek Ditch were directed to the automatic charts and to some extent to the measuring device itself and also to the use of an alleged rating table dated in 1912. One of the mistakes occurred when some employee of the State Engineer's office of Colorado worked up the discharge of Sand Creek Ditch for the years 1931 and 1932, based on an old rating table dated in 1912. There was newer and better information available, and it should have been used.

I did not work up the record as based on the old 1912 rating table. The record on Complainant's Exhibit 64 the Sand Creek diversions were 3,026 acre feet for 1931, I worked up the administrative reports of the Water Commissioner for that year and according to my summation they show 2,148 acre feet. My conclusions as to this ditch, [fol. 1007] and for that year, based on the (1619) automatic chart record, indicate 2,209 acre feet, which I believe should approximate the accurate amount.

The Water Commissioner's reports to which I have referred are the official documents in the office of the State Engineer of Colorado.

As to Sand Creek Ditch Diversions or 1932, as computed from the old table of 1912, and as shown on Exhibit No. 65, amounted to 7,652 acre feet. The Water Commissioner's reports of that year show a diversion of 5,132 acre feet, and the automatic chart record, according to my summation shows 5,307 acre feet, and this, I believe, is approximately the correct discharge.

The present flume at the Sand Creek ditch was constructed about 1921, and it is evidence that the 1912 rating table was based on a different flume than what is now installed in the ditch.
(1620) There is a substantial agreement between the Water Commissioner's reports and that compiled from the automatic charts, showing diversions by the Sand Creek Ditch when the proper rating table is employed in making

the compilations. I feel that Mr. Meeker made a mistake when he compared certain meter measurements with the old obsolete rating table, when a proper table was apparently in his possession, according to his testimony, having been supplied to him by Mr. McAnelly. To illustrate the effect of this error, the measurement made by Mr. Drummond, as testified to by Mr. Meeker, on June 21, 1932, showed a gage height of 1.55 feet a discharge of 43.76 second feet, when compared to the old 1912 table, a difference is shown of 14.4 second feet, or an error of 33%, as testified to by Mr. Meeker, but had he compared with the table then in service, supplied to him by Mr. McAnelly, the Water Commissioner of Colorado, the difference would have been but 3.36 second feet or about 8%.

[fol. 1008] In Mr. Meeker's testimony he mentioned the existence of the automatic register and of the shifting conditions due to sand, but apparently he forgot to describe the flume in the Sand Creek Ditch as being well located in a straight section of the ditch and of good concrete structure, where conditions for water measurement are good if not of a higher standing.

(1621) Mr. Meeker also criticised the automatic register charts on Sand Creek Ditch for the years 1923 to 1928, pointing out what he termed glaring inaccuracies, tested by his criticism of these years, the chart records of 1920, 1930, 1931 and 1932, are certainly much improved as they indicate most of the "on" and "off" staff readings and show substantial agreement between the staff readings and pen settings. In most every case where a staff reading was available, the pen record was found to be correct and likewise in almost every case the pen record when off of one chart agrees with the on record of the next chart. For instance, in 1925, Chart No. 1 is on at .85 feet and off at .75 feet, and it ends at 1.60 feet, which agrees with the staff gage reading as entered on the chart, and to my mind tends to lend weight to that first chart record. The third chart starts at 1.60 and end at 2.00, and in each instance is checked by the staff readings, while no staff readings appear on the subsequent charts, the pen line follows along in good sequence. In the next year, 1926, which Mr. Meeker classes as a poor record, to be used with but little confidence, he ignores the several marks on the chart line which evidence the fact that the pen was then tested and reset. On the second of

the three charts the pen was reset at 3.00 P. M., May 29th, [fol. 1009] and that was one of the dates when the flume was rated by (1622) Mr. McAnelly. The resettings serve the same purpose as staff gage notations and should be given recognition when the accuracy of the record is under investigation, particularly such notations as appear on the chart in 1927, on the 26th day of May, which says, "O. K. by McA." Interpreting this it means that Mr. McAnelly was there and that he found everything operating properly, and I would value that just as much as though there was entered on the chart a staff gage reading at the time the chart was put on and taken off. Had Mr. Meeker examined the charts of the Sand Creek Ditch for the years 1929 to 1932, and tested the accuracy of the chart record at the time he measured the meter, he could have testified that the record was then correct. He says he made a meter measurement on July 12, 1929, and found the staff gage then to read .69 feet, and the chart record of that date indicates that the pen recorded the gage within .02 feet of that setting or reading all during the daylight hours. He also mentions the measurement by Mr. Drummond on June 21, 1932, when the staff gage read 1.55. On that day the chart record was 1.60 at 8:00 A. M., and thereafter gradually declined to 1.50 at 4:00 P. M., and hence substantially agreed with Mr. Drummond's findings and exactly agreed if on that day he measured the flow at or near the noon day hours. Referring to the significance of the sequence readings, we know that the observer was there at the time the chart was taken off and at the time the new chart was put on. He, of course, might or might not read the staff gage and set that chart, but we find (1623) on charts that there are little variations between the staff readings and the pen line and we find indications on a good many of them showing that those little corrections have [fol. 1010] been made. If these readings recorded by the pen are the same on the chart when it is put on as they are on the chart that has just been taken off, it is a pretty good indication that at that point the pen was recording a true staff reading.

(1624) Referring again to the Sand Creek records, and after studying the relation of the measurements that have been made on that structure, with respect to the rating tables, knowing that those deviations have been comparatively

slight, I would rate the record as to the diversions on the Sand Creek Ditch for the years 1923 to 1928, as a fairly good record and the records during the past four years as a good record of discharge.

It is true that the charts indicate in a few places that there is some sand at various times in the still-well, which affects the chart registration. These occur probably at the (1625) beginning and at the end of the season and are of rather short duration, and involve but small quantities of water. There are a number of other instances based on meter measurements that have been checked against the rating table indicating rather reverse conditions. That is, that the charts, as computed from that rating table, might have given slightly less than full credit for the amount of water diverted. In my opinion these two general tendencies about balance each other, and for that reason I feel that the record taken as a whole is a good record. Including all the trans-mountain ditches, and considering them as a whole, I would class the record as good and considering the fact that the information is gathered at the higher elevations where these various projects are located. I am perfectly willing to admit that there are defects and imperfections, and still, I feel taken as a whole, the record properly should class as good.

[fol. 1011] (1626) I have visited the Laramie River Basin in Colorado and observed the land, ditches, crops and irrigation methods and the customs and practices which prevail there with respect to the use of water. I am also quite familiar with the other valleys that are very similar to the Laramie River Valley in their physical aspects and methods of agriculture, etc., in Colorado.

I am aware that the decree of 1922 of the United States Supreme Court in the former case of Wyoming vs. Colorado mentioned the quantity of 4,250 acre feet of water allocated to be taken and used by the 4,250 acres of meadow land in the Laramie River Basin in Colorado. I am also aware that the Complaint in the present Wyoming case alleges that the decree in this respect has been violated, and in support of that allegation says that the reports of the Water Commissioner show that the aggregate diversions of these meadow land ditches have been greatly in excess of 4,250 acre feet, and in fact, approximately 60,000 acre feet per year during recent (1627) years. I have not made a study

of the questions of the diversions made by the meadow land ditches, because the headgate diversions in whatever amounts they may be, have nothing to do with the amount of water actually used and hence nothing to do with the violation of the United States Supreme Court decree. If a diversion of say 60,000 acre feet of water had been made by the trans-mountain projects, it would show a violation of the Decree of the Supreme Court, but when made by the meadow land ditches it would not prove that the amount of 4,250 acre feet of water allocated for their use had been exceeded. My interpretation of the meaning of the alloca- [fol. 1012] tion of 4,250 acre feet of water does not mean headgate diversions, but the quantity of water actually used or consumed by these meadow mountain lands. From the observations which I have made of the soil, crops and irrigation practices in the Laramie River Basin in Colorado, it is my opinion that the amount of 4,250 acre feet per annum of water naturally consumed by the meadow lands has not been exceeded.

(1628) My opinion in this respect is based upon the belief that the allowance of one acre foot per acre, measured as the consumptive use of water, is reasonably adequate for the lands and crops of that valley, and upon the further belief that not more than 4,250 acres of such lands are now being irrigated, and upon observations which indicate to me that there has been no recent extensions or enlargements of ditches, and that no change has taken place in the kinds of crops produced, or in the customs and practices of irrigating the lands in the meadow mountain district. In other words, the original allocation seems to me to have been proper and adequate and no enlarged use of water has taken place which would result in any increased consumption in recent years, as compared to former periods.

The Decree of the Supreme Court as it appears to me is both clear and logical. The controversy arose, as between Wyoming and Colorado, by reason of a proposed new trans-mountain diverson. Wyoming alleged that such a proposed diversion would encroach upon and adversely affect her established appropriations. The Decree, as entered, imposed a limitation upon the use of water by such proposed appropriations, and thereafter mentioned certain allocations to individual Colorado appropriators, in each in-

stance treating with the taking and using the water in terms which related to the effect upon Wyoming appropriations, which is to say, in terms of water consumed. In the case of trans-mountain diversions the full amount of the [fol. 1013] diversions is consumed so far as other appropriators on that stream are concerned, but with these meadow lands' ditches, the diversions are meaningless, for a diversion of itself creates no injurious effect. It is only that part of a (1629) diversion as made by a meadow land ditch, that is so taken and used as to be withheld from, or not returned to, the stream, which can affect the stream flow adversely to Wyoming interests, which was the subject of controversy, and the question decided by the decree. All the allotments to Colorado appropriators were thus placed on the same basis. There are other phases of the decree itself such as the determination of an over-plus supply of water then remaining available to proposed appropriators, and there is a method of calculation by which the total supply and the over-plus are determined. That calculation and determination necessarily is based on consumptive use of the water under the Colorado appropriations, and as to the meadow land allocation, interpreting the Decree upon the same conditions under which it was formulated, indicates the allocation to refer to consumptive use and not to headgate diversions. Aside from the Decree itself and its terms and provisions, there are circumstances which influence my interpretation of this decree, one of which is the fact that in certain interstate compacts, such as the Colorado River Compact, the term "beneficial consumptive use" is employed (1630) in the allocation to Colorado appropriators.

I would expect to read either a compact or a decision, wherein an attempt was made to determine the rights of the states in interstate streams, where the headgate diversions were limited in the upper states to some specified aggregate quantity. Such provision would afford no protection to a lower state, for a diversion of water may be in one instance fully returned, and thus create no adverse affect [fol. 1014] whatever upon the lower state, while in another instance, the same diversion of water might be fully consumed and thus afford opportunity to consume the water in the lower state. The second reason for my opinion on this question is one, which I have designated as a natural con-

clusion. The specified rate of one acre foot per acre, in connection with the mountain meadow lands, irrigation, usually and customarily refers to consumptive use. That quantity is commonly recognized as the approximate consumptive use by such lands.

In my opinion if the Mountain meadow lands of the Laramie River Basin in Colorado were limited to a headgate diversion of one foot per acre, the result would be disastrous, for most of the value of the meadow lands would be destroyed; much of the acreage would have to be abandoned, and many of the residents of that Valley would be forced to move away. On the other hand, it is my conviction that no equal or compensating benefit would thereby be created and I seriously doubt if any real benefits at all would accrue to an interest lower down the (1631) stream. The hay crops that are produced on these mountain meadow lands use and consume a certain quantity of water which for all practical purposes may be taken at approximately one acre foot per acre. Even though abandoned, these same lands consume some water. What is now being consumed may be termed a beneficial consumptive use, for it produces a valuable crop which in turn makes possible the occupancy of the Valley. What these same lands might continue to consume in the production of willows, weeds, and other forms of non-valuable vegetation, may be termed a natural or non-beneficial consumptive use. That part of the hay meadow lands which is situated close beside, and at substantially the same levels of the stream, in the case of abandonment, would revert into willow, swampy conditions, and would still consume water, and the [fol. 1015] amount so consumed would probably so nearly equal the existing rate that little or no benefit could result from abandonment.

The process of reverting to primitive conditions can be witnessed in certain portions of that Valley, where, in the higher reaches, there were a few abandoned ranches. New growths of willows can be noted as spreading back over the old fields, and beaver-dams and other obstructions to the stream flow, are causing the water to spread out and thus (1632) increase the effects of evaporation. My conclusions regarding the rate of loss by transpiration, tests have indicated that the water consumed in the growing of weeds and shrubs is nearly the same as that required to

produce a crop, such as native hay. Other tests have also disclosed that the growing of a hay crop, to be harvested by pasturing, takes substantially the same amount of water as is used when the same crop is harvested. I have not made any tests to show either the total or the unit rate of consumptive use of water in connection with the mountain meadow lands. My opinion on this question is based on the total acreage which I believe to be about 4,250 acres, and on the general opinion of the adequacy of one acre foot per acre of consumptive use, and upon my observations which indicate that no enlarged use has taken place in recent years. It is my opinion that the total beneficial consumptive use of water in the meadow lands, as nearly as the same may be measured, would be found to approximate, but not to exceed, 4,250 acre feet per year. The consumptive use is not a fixed and standard amount, but varies from year to year and the rate must be considered as an average. It varies because the amount of the crop varies and be- [fol. 1016] cause climatic conditions vary. It has been my observation that consumptive use is generally the smallest in the years of good precipitation, the greatest water supply and the most in those seasons when the temperature and evaporation rates are (1633) the highest, and precipitation is the least. These variations of consumptive use are largely uncontrollable, except that changes be made in the character of crops, irrigation practices or acreage involved.

I can outline methods of making estimations as to consumptive use of water by these meadow lands, but I doubt if the amount could be accurately measured. To determine the quantity consumed by actual measurement, one would measure all the inflow into the Basin and all the outflow, and by subtraction, ascertain the difference, which would be the quantity lost by both beneficial and natural consumption. But to measure the inflow is most difficult, for every natural depression which contributes water at any time must be included, and these are very numerous. One might as well estimate the consumption in the beginning. Another matter worth the noting is that where the quantity consumed is so small in proportion to the total water supply, that when one had measured the supply he could not then be assured that the difference was not just an allowable error of measurement.

(1634) There is a second basis of making an estimate which might be pursued, that would involve test plots, and one projects the results of the tested area to the acre unit, and thence to the whole area.

The amount of consumption of water can only be determined or estimated after the full season has ended. The water has been consumed before the amount thereof can be ascertained, and as I say, the determination is most difficult to make. The Wyoming interests and appropriators are protected, even though the rate of consumptive use is difficult to measure, in so far as trans-mountain diversions [fol. 1017] are concerned, because such quantities can be, and are, being measured, and these measured quantities can be compared to the allocated amounts, and the quantity regulated and controlled. As to the meadow land appropriations, Wyoming has the protection of natural limitations. Nature has restricted the area, and climate limits the kinds of crops which can be grown, thus insuring that no enlarged use of water, by means of the meadow lands, can take place, and thus preventing any beneficial consumptive use beyond or in excess of the amount allocated to those meadow lands.

Cross-examination.

By Mr. James A. Greenwood:

Under the laws of Colorado as I understand them when a party is decreed an appropriation of water for any use, in a specific amount, he is entitled to divert that water from the natural channels and use it for the purpose for which it is appropriated, and he is not obligated to, except under special (1635) proceedings where an agreement is made to that effect, return any of that water to the stream. The question of return flow of the water is just the natural function of the water that has been diverted. It may get back to the stream or it may not. There is no attempt to determine a man's appropriation by the amount he consumes, but it is determined by headgate diversions. (1636) As I understand the ruling which prevails in Colorado, is to the effect that a person making an appropriation of water in a specified rate and amount, could, for his beneficial use of that water, consume all of it, and water appropriations are based on second feet rather than acre feet.

I have studied the Decree of the United States Supreme Court, in the former suit between Wyoming and Colorado, entered June 5, 1922, with all the ability of an engineer [fol. 1018] to read a legal decree. I have also studied the modified decree of October 1922, and I have read the opinion of May 31, 1932.

(1637) As I read the opinion the diversion quantity provided for the Laramie Poudre Tunnel fixes upon that new, or junior, use of water, a limitation of 15,500 acre feet. If I were asked to administer the decree as to that point, I would interpret it to mean that all junior appropriations, after the date of that decree, should not aggregate in any one year more than 15,500 acre feet. As to the senior, or other appropriations, I feel that a little different situation properly applies to them for the reason they were in service and were operating or recognized in the same way as the senior rights of Wyoming were recognized and necessarily the record they submitted was an average amount—for instance, to the Skyline, I feel that their rights are not limited to 18,000 as a maximum in one year, but are to be recognized to the extent of 18,000 acre feet per year as a mean condition, in any one year. I have never discussed my opinion in this respect with the State Engineer or Attorney General. and it is my individual opinion.

(1638) I feel that, for instance, as to the consumptive use of the meadow lands, that necessarily would have to be an average condition that could not be controlled as an annual condition; and as to the senior rights, both Wyoming and Colorado, that were mentioned in that interstate settlement, I am of the opinion that they were part of the findings upon which that division was made, and upon which a surplus quantity was calculated to exist, and that their allocations are means or averages.

Referring to that part of the opinion of May 31, 1932, in which you state the court says: "That in 1926, 1927, 1928, and 1929, with the knowledge, consent and co-operation of Colorado, diversions were made from the Laramie and its tributaries through the meadow land appropria- [fol. 1019] tions in various amounts, pronouncedly in excess of the 4,250 acre feet specified in the Decree." I feel that the court at that time was considering the question of a re-hearing and that the opinion was rendered in support of their decision to open the case and that is one

of the basis upon which (1639) they analyzed the situation. Settlement of the present controversy is more a question of definition, clarification of the former Supreme Court decision. As to the decree of the United States Supreme Court, I think it is perfectly logical and clear and if I were administering the same I would do just exactly as I have explained to you and I am (1640) sure that would not satisfy you and we would be back in court, and so on that basis it is not understandable. I think all that the court would need to do is to accurately state in terms of engineering practice what they intend the decision to cover. I recently made a trip through the meadow land valley of the Laramie River Basin in Colorado. I believe it was on the 10th and 11th of June, this year. We made a two day trip * * * and stayed over night. We went up on the first day to the location of the Parshall flume at the East (1641) Portal of the Tunnel. In addition to the personal inspection of these several water works I have obtained information from the study of the official records concerning these several projects which were on file in the office of the State Engineer in Colorado. The records consist of the administrative reports of Water Commissioner McAnelly. The automatic charts on file as to these various rating flumes, the current meter notes of the measurements that have been made on these several ditches, and the rating tables prepared and in use, in con- (1642) nection therewith. I did not make use of the Water Commissioner's annual field notes for the reason that I did not have the time to do everything that I might have done and I was not concerned about his administration; and I found [fol. 1020] that so far as trans-mountain diversions are concerned, that he was making reports covering all of those, all of which were filed in one convenient file, in the office of the State Engineer of Colorado.

I assume that the Water Commissioner's annual field book is an official record of the State of Colorado when filed in the State Engineer's office. I will not go so far as to say that all the data in the Water Commissioner's field book is authentic, proper and reliable, for I know that a lot (1643) of these Water Commissioners' field books are not correct. It depends on what you are studying, and what degree of accuracy you are looking for. I do not mean to say that those books are not accurate. I do not

know about those particular ones. What I mean to say is that I have made a number of surveys of areas in a water district reported by the Water Commissioner, and I do not know where he got his information, but he goes on year after year reporting something that does not exist. In summing up, I would say you could use these Water Commissioner's field books, and they are used by the State Engineer, and for the purpose for the information collected and I feel it is all right; but if you come down to details and extreme accuracy I do not believe that you can rely on that report of irrigated acreage as being entirely final. It happens that I know of a good many differences in that particular item that often become matters of argument.

(1644) I have not examined the field books of the Water Commissioner for District 48, as to the acreage which he says is irrigated, nor have I consulted the Water Commissioner's annual reports.

I would like to look at some of the other reports of the Water Commissioners before answering your question and stating whether or not the record of the Water Commissioner's Ditch Report for District No. 48, Division No. 1, [fol. 1021] covered by Complainant's Exhibit No. 3, and which you state shows 13,750 acre feet of water diverted through the tunnel in the year 1926, can or cannot be relied upon. It is my understanding (1645) that the Water Commissioner on the Western Slope does not usually report anything concerning trans-mountain diversions. I have no way of knowing whether the amounts of diversions in cubic feet in connection with these ditches is accurate or not as shown on line 10, page 2, referring to the diversions of the Laramie-Poudre Tunnel from March 1st to October 1st, 1926, which is Complainant's Exhibit No. 3. I understand that that notation has to do with the decreed rights, but I did not go into that in the investigations which I made. My computation and findings show that for the year 1926, there were 6,118 acre feet diverted through the tunnel for that year, while complainant's Exhibit 3, based upon the Water Commissioner's ditch report for the irrigation season 1926, District 48, Division No. 1 shows a total diversion through the tunnel of 13,750 acre feet. I believe the amount indicated on Complainant's Exhibit 3, namely: 13,750 acre feet is not accurate. (1646) I do not feel that

the record on which that item is shown in Complainant's Exhibit 3 is based should be relied upon. At least if I were trying to find the amount of trans-mountain diversions in the respect herein referred to, I would not think of going into District No. 48 to find one bit of information about it, for the reason that it is not customary for the Water Commissioner to report anything about water leaving his district. I heard Mr. McAnelly, the Water Commissioner, testify that he was not interested in anything except having a record for distribution, and that he did not know anything about the diversions, except the information given him from the employees of the people who appropriated water from the Laramie River. As the result of about 25 years of intimate relations with com- [fol. 1022] panies that are carrying out similar diversion projects, the fact that the observers are inexperienced has very little to do with the question of accuracy, because they do not measure water, they just look at a chart and take off some figures, and any 10 year old boy (1647) can do that, and do it right. As to the other phase of the situation, to which you refer, Mr. Mosier, the Water Commissioner in District No. 48 has no way of knowing, could not possibly be on the Western slope to compile an accurate record. On the other hand, Mr. McAnelly, the Water Commissioner in that district, has a very continuous and accurate check being made all the time. If the Water users brought 6,000 acre feet of water over, and Mr. McAnelly made a major error and gave them credit for 13,000 acre feet, he would have such a war stirred up there that he probably would never forget it, so that practically day by day check is the thing that ought to be considered when judging two records. It would be possible of course, to divert water from the Laramie River through the Tunnel or the Skyline, without any record at all being made and it would still be available for irrigation in Colorado.

(1648) I would not say that Water District No. 48 was not being properly administered. Mr. Mosier, Water Commissioner, is not supposed to make a record of water leaving his district, and I doubt if he has any record at all of the amount of water leaving the State. I doubt very much the accuracy of any record that Mr. Mosier may have of water used in his district. The reason I say that is because conditions are different than they are on the Poudre

side of the Tunnel. He does make some notations which guide him in his administration of water, but as a rule he has no rating flumes, lots of ditches without headgates, and he carries out a system of administration that is enforced upon him by the very nature of his district.

[fol. 1023] (1649) Such measuring devices that had previously been installed on the west or entrance portal of the Laramie-Poudre Tunnel at the time of my inspection were completely submerged, absolutely ineffective, and could not be made the basis of any record. I don't know about the particular year you mention, but I am very confident that no such major error could take place under the McAnelly reports.

The information which I have studied and relied upon is based upon the McAnelly records plus a check of the work that has been done by him in his water measurements, the rating table that he has used, the work in connection with meter measurements and rating tables carried on by the State Engineer's Department of Colorado, and also an inspection of each of the same charts that the observer put on and from which Mr. McAnelly afterwards got his information and which have been used by the State.

I visited what is known as the Divide Ditch, on the 11th of June, 1933, and also on the two days' trip, June 10th and 11th, made in company with the engineers and those heretofore mentioned, I observed and inspected the East Portal of the Tunnel and Skyline, the meadows and the Divide or Sand Creek diversion works. I had never been down the Laramie River prior to this trip. In referring to Mr. Meeker's testimony, in which he called attention to what he calls glaring defects or errors in the records on Sand Creek diversions, I have stated that he perhaps should have used the McAnelly rating table instead of the 1912 one. I think he made a mistake, just as many of us make (1650) mistakes. I would also say that the State Engineer's office unfortunately made a same mistake in using that same [fol. 1024] table in preparing the compilation on the Sand Creek Ditch, and of course the State Engineer is responsible for mistakes or errors made by employees of his office. (1651) I find there are records in the office of the State Engineer of Colorado showing an attempt to rate the Sand Creek flume, after the 1912 rating table had been prepared

and that was in the year of 1921, based upon the McAnelly report and resulted in a new rating table being prepared, dated May 26, 1922. I found a measurement dated May 29th, 1926, and another one dated May 24, 1927, and at the time of my study I also had before me two measurements testified to by Mr. Meeker and Mr. Drummond, witnesses on behalf of the defendant in this case, one in 1929 and one in 1932. The measurements that I have just referred to as having been made in 1926, and 1927, were not a series of measurements, but what is known as spot or check measurements. I did not find any record of measurements being made, or table being prepared, except the two, one in 1912 and one in 1922. I felt as to the two measurements of 1926 and 1927, which I plotted, that although they did not exactly hit on the 1922 curve, they did not miss it far enough that I would consider it necessary to prepare a new table.

The 1922 table to which I refer was found in the card file in the office of the State Engineer and was not in the rating books.

(1652) Referring to my previous testimony concerning the Tunnel flow, I intended to indicate that flow conditions immediately above the flume are not conducive to the requirements of making an accurate current meter measurement under all stages and conditions. It requires rather extraordinary care on the part of the hydrographer to obtain accuracy there. Also that measurements of water [fol. 1025] made in shallow basins cannot be relied upon to (1653) get exactly true conditions existing there. I feel that in these smaller stages, if a person gets or comes within 10%, it is a fairly good check. I have also previously stated that I examined quite a number of measurements, approximately 25, over a six years' period, and outside of two, both of which were made in the month of July, 1932, I would consider all of them very good checks, confirming the accuracy of the standard Parshall rating table. I have also stated that as a result of the study of these approximate 25 meter measurements made by different hydrographers under wide and varied conditions, that practically all of them, except those two that I have discussed, so closely approximated the standard Parshall table, that it lended weight to the opinion that the record was accurate. I admit that the conditions existing at the outlet of the Laramie Poudre Tunnel are different from what most of us

believed a Parshall flume would operate accurately under. Nevertheless, the records prove that it has operated accurately.

(1654) The situation existing at the site of the Laramie-Poudre Tunnel outlet is that the channel turns about 40 feet above the flume and while that bend is contrary to the idea, we used to have in connection with standard rectangular flumes, it opens a question as to the accuracy with which this device works, but after all, any one that goes there and inspects its workings under those conditions would come away convinced that the normal flow conditions are fully restored by the time the water reaches the throat of that flume.

(1655) If Mr. Parshall should say that the installation [fol. 1026] of the flume at the Laramie-Poudre Tunnel outlet is faulty and that the chance of accuracy of the record is questionable for that reason I would say that he was discussing the device in his research, scientific type of mine, and I am discussing it from a practical field condition. I could say from my viewpoint it is right, and we could still both be consistent. I did not mean to indicate that Mr. Parshall is not a practical man, but I say that his idea of variance might be very rigid where mine might be very liberal, working in the field. You cannot get me to take a position contrary to Mr. Parshall. The thing I am questioning is your interpretation of what he said.

(1656) I am saying that knowing the ability and reputation of Mr. Parshall as a hydraulic engineer, and his acquaintance and knowledge and skill in the measurement of stream-flow, that he is an authority to be relied upon.

(1657) I have previously testified that it was an exceedingly fortunate condition that the bend in the channel as the water comes through the tunnel was there before the water reached the throat of the Parshall flume, for the reason that the bend tends to reduce the velocity of the current to some extent. If the flume were built real close to the Tunnel portal where the velocity issuing from the portal was in excess of the throat velocity in the device itself, it might not work. If the device was so placed that the throat section could not function it might affect the discharge of the water—I would not say now that it would, nor would I say that if the throat of the flume at the East Portal of the Tunnel had a greater angle, a horseshoe, that it would in-

crease the accuracy of the (1658) measuring device. My reason for saying that the curve improves the possibility of the accurate measurement is somewhat based upon the fact that it does tend to break up the terrific velocity of the [fol. 1027] water as it issues from the Tunnel and as the water approaches the measuring device there are more nearly restored normal conditions.

I have also stated, that the rectangular flume installed on the Sand Creek Ditch is in a straight section of the ditch and the same is true of the installation of the flume on the Skyline Ditch. In other words, a straight section on the Canal ditch is a favorable place for installing a measuring device. At the outlet of the East Portal is the only possible site for the location of the measuring device, because on the west (1659) side you would be continually involved with cave-ins and slides at the approach and the Parshall flume would not function properly. You would have a degree of submergence at which it would not operate. To attempt to install a measuring device at the West Portal would involve the lining of the channel of the ditch as it approaches the West Portal, as well as the lining of the Tunnel itself. The major effect produced on the devices that have been apparently in service there, has been caused by the slides in the cut just before reaching the Tunnel, and if that happened it would affect the registration made by the measuring device.

(1660) In the averages and total of trans-mountain diversions of water from the Laramie River to the Poudre River, I did not take into consideration the diversions made on the mountain-meadow lands. If there should be added to my totals of trans-mountain diversions for the years 1926, 1927, 1928 and 1929, the diversions made for irrigation of the mountain meadows lands as taken from Mr. Mosier's annual reports, the total would be some large figure and if for the year 1926 in which I have given a total diversion, deducting Sand Creek and Deadman, of 25,021 acre feet, there should be added a diversion made to meadow lands in [fol. 1028] that year as indicated by Exhibit No. 3 of Complainant, 56,705 acre feet, the total is considerably in excess of 37,500 acre feet.

The way I have interpreted that decree is that all of the diversions were thereby made in terms of consumptive use, which is the only way that the interests of Wyoming

could be affected, and as to the meadow lands, I feel that the decree undoubtedly means consumptive use of water. I realize you have a different interpretation, but still that is mine and I have tried to explain the several bases upon (1661) which I arrive at it. At the time I visited the Tunnel, there was flowing through the tunnel approximately 100 second feet of water and that is the only time I observed the current of the water as it went through the tunnel. When I speak of the Laramie-Poudre Tunnel, as a matter of fact, that is just a unit or section of a canal or irrigation ditch that happens to go through the mountains, it is merely a comparison of appropriated water. As I have heretofore testified, I am (1662) connected with a number of irrigation projects or enterprises in the Arkansas Valley of Colorado, but in recent years I have not done very much in connection with the actual process of measurement and the diversion of water. So far as being on the job every day; my work is more or less along the line of consulting expert. The diversions that are made in the Arkansas Valley are supervised personally by the Water Commissioners of the district. Taken as a whole I do not believe the Water Commissioners in our district make any records. They make a lot of notes, and when you come to look at their notes it looks to me that they are trying to make some basis for their charge for their work, or some item permitting them to say they worked that day, but they do not make a record. Down in that section we started a [fol. 1029] daily record in order to have an accurate record of the diversions of the water. I think the record is most accurate when worked up after the work is done. The daily report is essential in our opinion for work. It stops a lot of litigation.

(1663) I have not studied any of the adjudications made for the meadow lands in the Laramie Valley in Colorado. As to whether or not the adjudications authorize an appropriation of water of headgate diversions or on consumptive use, I would say that as to adjudicated rights they are based on headgate diversions. My interpretation of the decree of the United States Supreme Court is not based on anything in the decreed right, giving to the individual appropriator a consumptive use, but it is based on your construction of what the Supreme Court of the United States intended to give them with reference to the water they should

use from the river. That is, to the individuals who make up that group, their rights are based on diversion quantities, measured at the headgates, but as I read (1664) the Decree, allocating to that group of interests what they had then appropriated insofar as that appropriation affected the outflow into Wyoming, or the private appropriators of Wyoming, I feel confident of this, that had the intent been to fix the amount as the headgate diversions it would have been fixed at a much greater amount, or else no computation or calculation or over-plus would have been made.

Redirect Examination.

By Mr. Shrader P. Howell:

In making my computations to ascertain the annual trans-mountain diversions I used the original automatic charts in every instance where they were available and that is the basis of my opinion as to the amounts diverted. I had to determine day by day the second foot diversions [fol. 1030] which I have for convenience reduced to acre feet. I also checked the administrative reports in order to determine how that report aligned itself to this record that I was making up. I also used the administrative reports for a second purpose, and that was, having determined its accuracy, I felt more reliance on its use in the few years for which automatic and original (1665) records were not available for my inspection.

I used the automatic charts, the original records from Water District No. 3 of which Mr. McAnelly, is Water Commissioner, but I had no occasion to use the records from District No. 48 of which Mr. Mosier is Water Commissioner.

Mr. Howell: That is all I think.
Mr. Greenwood: That is all.

[fol. 1031] H. L. Potts, witness in behalf of defendant:

Direct examination.

By Mr. Shrader P. Howell:

(1666) I am a civil engineer and have resided in Denver for the past twenty-six years. At the present time I am

an engineer with the Denver Board of Water Commissioners, and (1667) have been with the present board for about ten years. In a general way my duties have consisted of either doing personally or supervising all the hydrographic work done for the Water Board, and I have charge of a number of rating stations and automatic gages in the system. I cooperate on a number of stations on the Platte River and its tributaries, with the U. S. Geological Survey, and also the State of Colorado. Any special seepage or return investigations are turned over for me to handle the field work, together with the devices and means of carrying out those studies. My work has been almost entirely in the development of water supply in which I collaborate with Mr. Bull, but I handle and am responsible for all of the field work. I was raised on an irrigated farm just South of Denver, and attended grade and high schools at Littleton, and during the summer vacation worked for the Denver Union Water Company; from 1904 to 1907, I was a student at the Colorado Agricultural College, and the following years employed by the Summit County Power Company, doing all the field work necessary for installation of the hydro-electric (1668) plant at Dillon, Colorado. In 1909, worked on an irrigation project in southwest Kansas, making a study of the under-flow conditions and conducting surveys for an irrigation canal of about 98 miles in length. In 1910 I was employed by the Denver Reservoir and Irrigation Company, making surveys and seepage return investigations, and from about 1915 to 1923 I was in business for myself and in the latter year I again went to work for the Denver Board of Water Commissioners, by [fol. 1032] whom I have been employed ever since.

The Denver Water Board maintains a number of gaging (1669) stations on the South Platte River. We have made a rather extensive study of the return flow from that river through the sanitary sewers of Denver. I have charge of all those stations and see that the gages are properly maintained and the records are worked up from the charts. There are four principal sanitary sewers in the City of Denver, and we have an automatic recording gage on each one of those sewers near the outlet and are making observations of the amounts of water being discharged by those means. I am now starting on an investigation of the conditions in South Park, the object being to make a determina-

tion of the use of water in that district and by "use" I mean the amount of water that is actually consumed either in transpiration or evaporation.

At Eleven Mile reservoir there is a gage maintained by the United States Geological Survey in cooperation with the Denver Water Board and the State of Colorado, and I have (1670) more or less charge of the operation of that station.

In addition to this reservoir the Denver Water Board owns Cheesman, Antero, Marston Lake and the Platte Canon Reservoir, and there are gaging stations below each of those reservoirs.

We have different makes of automatic registers installed on these various works including quite a number of Bristol water level gages. As to rating flumes some of our devices are the Venturi meters; in some cases, we have weirs, also the ordinary type of rectangular flume and since about 1925, we have installed a great number of Parshall flumes, running all the way from a throat width of 3 inches up to a width of 20 feet.

(1671) I am familiar with the so-called rectangular rating [fol. 1033] flume which is nothing more or less than a control section in a canal. It consists of a rectangular box, ranging anywhere from maybe five to twenty-five feet or more in length; the floor is supposed to be level, and the sides perpendicular. An attempt is made to put the box in a straight section of the ditch or canal; it is then read at various depths with a current meter and from the curve developed from these measurements, rating tables are made. There are some special locations where I would say that the rectangular flume is the only practical method to use, owing to the grade of the ditch (1672) or canal, or some other governing condition.

Ditches located at higher altitudes usually have higher velocity than the ditches at lower altitudes. This high velocity is inclined to keep the rectangular flume clear, while in the lower altitude, where the ditches are more sluggish and often the water is heavy with silt, there are deposits formed on the floor of the flume which will change the ratings. Also the presence or absence of vegetation, and the character of the soil will in some instances effect the operations of the flume.

(1673) Shortly after I went to work for the Board of Water Commissioners in 1923, I learned that Mr. Parshall was working on a water measuring device at Fort Collins. I spent some time with Mr. Parshall, investigating the device and shortly afterwards the Denver Water Board installed the first improved Venturi flume on the Harriman Ditch, which diverts water from Bear Creek at the town of Morrison, and since that time I have installed a number of these flumes. The American Society of Civil Engineers recommended that Mr. Parshall be honored by having this flume named after him, and so it is known as the Parshall flume. It consists primarily of three parts—the upper, or [fol. 1034] converging section, the throat section and the diverging section. On the upper section the floor is level and the sides are perpendicular, but the sides taper at an angle, diminishing the width of the flume. At the point of the least width in the flume, it is called the crest. The crest is where the throat section begins. At the crest, the sides are parallel and perpendicular, while the floor drops a distance of nine inches.

In one diverging section, the sides are perpendicular, and diverge at a certain fixed angle, and the floor raises in that section from a point nine inches below the crest to within three inches of the crest, or the elevation of the floor in the upper section.

(1674) The first part, that is the upper part of the flume is the real important part. The purpose of this converging section is to equalize the velocities of water as they enter the flume. The real measurement, and the real factor in determining the amount of water flowing through the stream, is controlled by the crest. The lower end is simply put in there to take the water down stream and to more or less reduce the velocity. The height of the water flowing through the flume is measured two-thirds of the distance up above the crest on one of the converging walls and in free flow conditions that is the only measurement that is necessary to establish the amount of water flowing through this section.

(1675) The Parshall flume is a very accurate measuring device and is practically fool proof. In other words, it is almost (1676) impossible to tamper with this device. Another of its advantages is that it can be installed in practically any river or canal and requires very little head

to operate; that is, the loss of head is very small on the flume. However, to my mind, the great recommendation for the Parshall flume is its ability to keep itself clean under [fol. 1035] all conditions and by that I refer to the throat which is the important point in the flume and is in fact the control point. I am familiar with the measuring devices that are installed on the Laramie-Poudre Tunnel, the Sky-line flume and the Sand Creek flume which I saw for the first time on the 10th and (1677) 11th of June, 1933, while on the trip made by Mr. Tipton, Mr. Bull, Mc McGraw, Mr. Patterson, Professor House, Mr. McAnelly and Mr. Howell and myself, at which time we visited and examined the structures and canals of these works. I had seen the measuring device on the Laramie-Poudre Tunnel before this trip.

On June 10, 1933, at the time we visited and inspected the condition at the Laramie-Poudre tunnel, we found in the neighborhood of 100 feet of water coming through the tunnel at a very high velocity, which carried a bunch of rock and sand from either inside the tunnel or near the West Portal. There was quite a sand bar laying against the concrete wall of the channel and some pieces were rather to- large to be called sand extending down to the flume and within it for a certain distance. The water goes through the tunnel at an extremely high velocity, hits the concrete wall and naturally the velocity is reduced and the debris that had been carrying was dropped. Some of it was carried on down to the flume, but as the velocity in the flume increased beyond a certain point, any rock or sand which had come that far was carried on through and the throat was clean.

(1678) As the water goes through the tunnel it enters the concrete flume, or lined section of the ditch and then turns almost at right angles. At some 75 feet below this turn and at the end of this concrete lining or flume is the Parshall flume. The structure is of wood, but all the water coming through the tunnel is forced to flow through the flume.

Two-thirds of the distance up from the throat a pipe runs out to the stilling well at the side of the flume where [fol. 1036] a Bristol water level gage has been installed, which is of the latest type. In this gage house, extending down into the water, is a metal gage to record the depth of the water flowing through this flume. The debris, gravel

and sand which I have referred to did not extend below the point where the pipe is taken out to return to the stilling well. As I stated, the throat of the flume was clear. The gage tender informed us that there was more rock and sand in it this time, at the time of our visit, than ever observed before.

(1679) I understand that the reason for this was that there had been a cave-in in the Tunnel, sometime last year, and that it was necessary to go in there and break up quite a number of rocks from this slide inside the Tunnel. The Bristol type of measuring device is a standard gage for field work. I made meter measurements of the discharge of water through this flume at the tunnel on June 10, 1933. In the party inspecting the works on this date was Mr. C. E. McGraw, Hydrographer for the State Engineer of Colorado. Mr. McGraw and I looked over the conditions and decided that in order to check each other we would take a reading in the upper end of the flume at different points. Mine was taken well up in the converging section, that is closer to the Tunnel, where the velocities would be very uneven and not at all uniform. Mr. McGraw moved down a little nearer the throat and took his reading, the velocities being higher there than where I took mine.

(1680) The only method of taking the readings for accurate measurement recognized by the United States Geo- [fol. 1037] logical Survey was what was known as the two point method, and our measurements were taken by this method. It is necessary on a mountain stream or canal to take reading of the gage height at different times during the work. The readings up there were taken very carefully with what amounted to a hook gage, the observations being taken (1681) by Mr. Tipton as the flume was being rated.

Mr. McGraw is one of the official hydrographers of the office of State Engineers of Colorado, and in taking our measurements we used two sets of meters. I used in taking these measurements a new Gurley meter, which had been purchased by the Water Department about the first of May, 1933, and the meter had been taken to Fort Collins, to the Experiment Station on May 5th, where it had been rated. The meter used by Mr. McGraw was the property of the State of Colorado and I understand was rated last fall.

It would not in my opinion be possible to determine an accurate gage height-reading by reading the gage on the outside of the still-well, for the reason that there is too much surge through the flume which the stilling well flattens out and reduces the velocity so that it is possible to get a real close reading. Where the gage is in the stilling well, *the readings of* the staff gage are taken from the inside.

(Defendant's Exhibit V-1, marked for identification.)

[fol. 1038] (1682) This exhibit shows the notes of the meter measurement which I took at the Parshall flume at the Laramie-Poudre Tunnel on June 10, 1933.

At the time we took our measurements there was a great deal of fluctuation, so I figure that it was impossible to determine the depths of the water at the various points closer than .05 of a foot. My notes figured up that, at the time I took the measurement, there was 91.95 second feet passing through the flume, and the mean gage height at that time was 2.326. The Parshall flume standard table indicates that with a gage height of 2.326 there would be a discharge through the (1683) flume of 92.25 second feet. Thus there would be a difference between the measured amount of water flowing through the stream and the calculated amount of .3 of one cubic foot, or in other words a .34 of 1% variation. There was another measurement of the flow through the Laramie Poudre Tunnel made on June 10th, by Mr. McGraw, the Hydrographer of the Colorado State Engineer's office, who took a meter reading immediately after I finished my reading, but at a different location in the flume. He went down nearer the throat, the velocities were higher at that point and in my opinion conditions were not quite as favorable for him as they were for me, owing to the high velocities.

(Defendant's Exhibit V-1 offered in evidence.)

(Defendant's Exhibit W-1 marked for identification.)

[fol. 1039] (1684) During the measurement which I took the water level remained fairly uniform about one-half way through the observation, when it began to rise. When Mr. McGraw started his work it was still rising and from the time this work started until our meter measurements were finished, there was an increase of practically 10 second feet through the flume.

Defendant's Exhibit W-1 are the official field notes of the observations taken by Mr. McGraw on the 10th of June this year, on the Laramie-Poudre Tunnel. The results of this measurement shows that there was 100.7 cubic feet per second passing through the flume at the time Mr. McGraw took his (1685) measurement. The mean gage height during Mr. McGraw's measurement was 2.498 and the Parshall flume at that elevation showed a discharge of 103.4 cubic feet per second. The measured discharge by Mr. McGraw was 100.7 cubic feet, or a difference of 2.7 cubic feet per second between McGraw's measurement and the theoretical discharge of the flume. This is a variation of 2.6%. (1686) The readings as shown on Defendant's Exhibit W-1 were taken by Mr. McGraw and the notes were recorded by me. I did not have any knowledge what the gage height reading was when the notes were figured up, in fact, our notes were figured and, if I remember correctly, we finished figuring our notes before Mr. Tipton finished the weighted means, and afterwards I checked these figures. In other words, the computations were made independently.

(Defendant's Exhibit W-1 offered in evidence.)

[fol. 1040] In my opinion the Parshall flume at the Laramie Poudre Tunnel outlet on June 10, 1933, was accurately measuring the flow of the water and the automatic recording device was correctly recording that flow.

(1687) I believe that the accumulation of gravel above the Laramie-Poudre Tunnel outlet does have some effect on the flow of the water but from my own observation I do not think the effect is serious enough to be considered; in other words it is of very small importance. I have never known a case of gravel lodging in the Parshall flume throat and that is the controlling point of the flume. From my experience as a Civil Engineer and the observations I made on June 10th, 1933, it would be impossible to put in measuring devices in the outlet of the Poudre Tunnel that did not have a very decided turn or angle. The water comes through the tunnel at a very high velocity and it is absolutely necessary to reduce that velocity in some way or other. That could be accomplished by a system of baffles, or by having the stream (1688) flow directly against the wall of this concrete structure. I do not feel that the physical conditions are ideal, but I do feel the flume gives

a correct measurement of the water flowing through the tunnel.

I would say that the curve shown on Defendant's Exhibit E-1 is an excellent rating curve. The period of time covered by the measurements shown on the curve, Defendant's Exhibit E-1, is from 1927 to 1933, and I would say that [fol. 1041] there was nothing to indicate the fact that the flume was (1689) not operating properly at all times during this period, that is from 1927 to 1933, inclusive.

I believe that I have examined all of the old automatic register charts for the Laramie-Poudre Tunnel, examining each individual chart, noting the time and gage height recorded by the pen, when one chart came off and when the next one went on. I checked to see whether the clock was running with somewhere near accuracy, or not. I noted at different points where the gage height appeared to have been read by the observer and checked. There were a number of omissions also. There were times when the gage tender would fail to put down a gage height, and also times when they were careless with recording the dates, and in some instances where the pen recording the off position did not check exactly with the position on the new chart, but this often happens in our gages, so I did not figure it was of any serious importance. While I would not say that the records are good, I feel that taken as a whole, a fair field measurement can be determined at this point. By a fair field measurement I mean within a reasonable degree of (1690) accuracy.

On occasion of my visit to the Poudre Tunnel on June 10, 1933, I talked with the gage reader at the East Portal of the Tunnel, who is a little above the average type of man usually employed as a gage reader. I feel that he understands what he is doing, and is performing that work to the best of his ability. I might say that I would be willing to have him work for me as a gage tender.

It does not require generally a highly skilled technical [fol. 1042] man to properly care for these measuring devices and from my experience in connection with the Denver Water Board, I would say that it does not require a very long period of time for a fairly intelligent person to become accustomed to the duties incident to a gage reader's work. I figure that showing a man how to change the gage chart once, and impressing upon him the necessity

of filling in all the blank spaces on the chart is about all the training he needs. Practically all of the water recording gages, especially the Bristol gages, are more or less fool proof. All a man has to do is open up the gage, put on a chart and close it up again.

(1691) In my opinion the present measuring flume at the Laramie Poudre Tunnel is the only device for properly measuring water at that point under the physical conditions that there exist. The accuracy of the discharge would be very seriously affected if it was attempted to put a measuring flume at the West Portal of the Laramie Poudre Tunnel, and my reason is that where the water is diverted from the Big Laramie to the portal of the Tunnel the grade is very flat and the velocities were therefore, slow and without some very extensive changes in the headworks it would be impossible to put a flume in there that would operate under free flow conditions, and it would make it necessary to constantly be correcting for submergence. And if there should be a slide in the tunnel the water would back up and would show that there is quite a flow going through the flume when, in reality, the water might be absolutely still.

(1692) I observed upon this trip, June 10th, last, at the West Portal of the Tunnel, what I presumed to be a measuring flume. It was entirely under water, and there were only a few timbers sticking out above the water submerged. The flume sides and everything, were entirely submerged and the water was level at that point. I also visited on June 10th the flume at the Skyline Ditch and observed the physical conditions that existed. The measuring device or [fol. 1043] flume on that ditch was a timber structure of standard construction and has a standard stilling well, with a Bristol water gage installed in the house. This flume is located in a fairly straight section of ditch, and the velocities through the flume are about as uniform as could be expected with a device of that type. The velocity of water through the flume was such that the floor was fairly clean.

(1693) There was very little evidence of any deposit on the floor of the flume, and I would say that the condition of this flume was possibly a little better than the average condition found in measuring flumes. On this visit I made the same type of measurement which I made at the Tunnel of the flow of the water through this flume, that is using

the two point method, and during the time of the metering constant check was kept on the elevation of the water in the still-well.

(1694) The water surface was more or less rough, however, it was such that I feel we were able to get a very nice reading, and in my opinion the flume was performing as well as the average or possibly a little above the average, of the ordinary rectangular flume.

The measurements which I took there were checked by Mr. McGraw. I have examined the rating curves for the Skyline Ditch and tables on file in the State Engineer's office and also the register at the flume, together with the charts and I believe that the gage at the Skyline ditch records the correct depth. It is one of the most recent types of Bristol gages and is more or less fool proof after it is once set, with very little (1695) danger of becoming deranged in any manner. In my opinion based upon my examination of the charts and rating tables I would say that the amount of water diverted by the Skyline Ditch can be [fol. 1044] ascertained within reasonable limits. While on this trip on June 10th and 11th, 1933, I talked with the gage reader at the Skyline Ditch, and I consider that he is a very competent man and he appears to give a little more thought to the detail of his work than the ordinary gage reader. In other words, his records appear to be more complete. On this same trip I visited the Sand Creek Ditch, which is also known I believe as the Wilson Supply Ditch, or Divide. This same party that I (1696) have mentioned before visited the Sand Creek Ditch on this trip and Mr. McGraw and myself took a check measurement immediately after our lunch. The rating flume on this Ditch is a concrete structure of the ordinary rectangular type and I consider the location is as good as could be possibly found in that canal. It is equipped with a stilling well, and an automatic Bristol recording gage, which is standard equipment. I found approximately 3 feet of water in depth passing through the flume, and on the (1697) left hand side of the flume we found a small deposit of sand which extended for a short distance on the floor of the flume, the other side being perfectly clear. In rating this flume I used the two point method, or the two-tenths eight-tenths method, and the same method was used in the other two cases. We also used the same procedure that

we did on the other two that I have mentioned. I would say that the installation of this flume is much better than the average installation.

(1698) I have examined the rating table or curve prepared for the Sand Creek Ditch in 1922, and in my opinion accurate computations of the discharge made by the Sand Creek Ditch may be made from those records in the State Engineer's office assuming check measurements were made each year. It is not necessary to make a new rating table each year. In fact, under average conditions, if the struc- [fol. 1045] tures are properly installed, one rating table would be good for a number of years. It is, however, desirable to make a check rating from time to time in order to satisfy yourself that there has been no change and that is sometimes what we refer to as "spot" measurements. I have tables that I have used since 1926, and in checking up on this from time to time I have found slight variations, either plus or minus two or three per cent., but I consider that as (1699) close as is necessary for practical purposes.

Under such circumstances there would be no necessity for making a new table. I talked with the gage reader at the Sand Creek Ditch on June 11th, last, and I feel that he understands his duties and that he is competent to perform them. I have examined Complainant's Exhibits Nos. 66, 67, 68, 69, 70 and 71, which are the automatic register charts on Sand Creek Ditch for the years 1923 to 1928, inclusive, and while I could not grade those charts quite as high as the charts on the other two stations, yet I would say that by an examination of each individual chart, I feel that they constitute a fair record. There are a number of omissions and there are points in there that are rather vague, but it is possible, after a careful study of the charts, to tabulate a correct record.

I also exaimned the automatic register charts at the Sand Creek rating flume for the years 1929 to 1932, inclusive. (1700) I would say that as to those charts, they constitute a fair record, a little bit better than the ones previously mentioned. The gage tender, seemingly, had taken a little more care in filling out the charts.

On the ditches and reservoirs of the Denver Water Board under which I am connected, we maintain charts in

a number of cases exactly the same as the form used on these trans-mountain diversions. The Denver Water Board [fol. 1046] supplies a population of approximately 300,000 inhabitants, that is the metropolitan district and it also has under its jurisdiction certain irrigation ditches and the charts used on these various trans-mountain diversion ditches compared favorably to those of the City ditches; while there were errors and omissions in these charts, I found no chart where it was necessary to discard it. (1701) These charts that I have examined compare favorably with similar charts used in connection with our own work on the Water Board.

I am familiar with the method employed to irrigate native hay meadows by reason of having been very closely connected with some studies made in the South Park, during the past ten years. I became familiar with the condition prevailing in the meadow lands of the Laramie River Basin as a result of the trip made through that Basin on June 10th and 11th, 1933. The meadow lands in the Laramie River Basin in Colorado are very narrow, and in driving along the roads you can see practically every foot of the meadows from one (1702) end of the Valley to the other. The River meanders down through the center of the Valley and at times there will only be meadows on one side and at other times there will be meadows on both sides, but they are very narrow.

The hay farmers in that Valley turn the water on the first thing in the Spring and allow it to run more or less as it pleases across the meadows all summer long. A short time before they are ready to cut the hay they shut their headgates down and allow the land to dry up enough so that they can get in with their mowers.

(1703) At the time of my visit to the Laramie Basin in June last, the farmers were using the usual flooding method. They turned all the water into the ditch that it [fol. 1047] would hold and allowed it to flood over the banks at different points, running across the meadows which up there have a pretty fair drainage toward the river, and the excess water went directly back into the river. In my opinion there could not be any substantial increase made in the irrigation development of the meadow lands in the Laramie River Basin in Colorado. Based upon my familiarity with the conditions in the South Park, which I have

said before compared very closely to those of the Laramie River River Basin in Colorado, it is my opinion that it would be impossible to have those meadow lands continue as hay lands with only one acre foot per acre diverted. I feel that the meadow lands would simply dry up and the economic effect on the Valley would be that it would simply revert to the wilds and probably result in abandonment.
(1704) At the time of my visit to Sand Creek Ditch I found two steel radial or Tainter gates in the channel of the stream and the diversions through the ditch are caused by closing the gates in the stream channel and opening the gates in the canal. When I was there, there was quite a considerable leak, which is not uncommon in that type of gate. The water was coming through the bottom and flowing on down Sand Creek, and I made a rough estimate that there was in the neighborhood of 3 second feet leaking through. We drove back down the road across Sand Creek, I should judge about two miles below the diversion dam, and at that point I estimated there was about 20 to 25 second feet of water in Sand Creek. We also drove down Sand Creek Valley, past Chimney Rock, and stopped at Running Water Ranch, which (1705) is about two miles across the Colorado line at which point we estimated the [fol. 1048] water passing there to be from 50 to 60 feet. We next drove I would say about two miles from that point down to the Lindquist Ranch, at which point we estimated that there was approximately 65 or 70 feet of water passing that point. This ranch is about five miles across the line into Wyoming and it is about where the Tie Siding road crosses Sand Creek. We observed while on our trip over into Wyoming that a number of ditches were taking water from Sand Creek.
(1706) Defendant's Exhibit I-1 is a Bristol chart which was set June 11, 1927, and removed June 18, 1927, and is supposed to record the depth of water flowing through the flume during that week and the same is entitled "Laramie-Poudre Tunnel." A notation appears on the chart on June 16th, "Gage Corrected —0.16—" and signed by "Parshall". There is an arrow drawn from this point down to a break in the open line, showing that correction has been made in the pen record at that point. That notation to me, as an engineer, would mean that the gage itself, or the staff gage, had been placed at an elevation which failed

to show the correct, or actual depth of water, passing through the flume, and that Mr. Parshall found an error of .16; it would be simply a matter of subtracting the .16 of a foot from the gage heights as indicated by the pen in order to compute any correct gage height for the period of time preceding the notation.

Cross-examination.

By Mr. Greenwood:

(1707) Prior to my visit of June 10th and 11th, last, I had never inspected the diversion works on the Skyline Tunnel and Sand Creek Ditches. In my direct testimony referring [fol. 1049] to the automatic gage charts on the Sand Creek Ditch, I stated that in my own work with the Denver Water Board I would find a chart that I would have to discard, but that I found no such charts in the examination of those in connection with the Sand Creek Ditch.

(1708) I stated that I believed it possible, from the official records in the office of the State Engineer of Colorado, to arrive at a correct record as to the volume of water discharged from the Laramie to the Poudre River. My study as to the accurate discharge of water from the Laramie Poudre River did not extend to the examination of the records and comparison of the reports for the year 1926, as made to that office by the Division Superintendent and the study made by Mr. Patterson, or the annual reports made by Commissioner Mosier, but my study was based upon examination of the records that were called to my (1709) attention. I did not inspect the still-well on Sand Creek, but did inspect the automatic register. In my testimony on direct examination, where I referred to the river carrying so much water, I had reference to Sand Creek. I would judge that at the time of our visit on June 11th, they might have been having the peak run-off of water in Sand Creek, although I could not pass on that definitely. I don't know from my own observations as to how long Sand Creek might carry as much water as I observed at the time of my visit.

(1710) The reference made on my direct examination to the fact that the concrete wall at the East Portal, reduced the velocity of the current before it got into the throat of the flume comes about in just about the same way as you

would shoot a stream from a fire hose into a blank wall. It [fol. 1050] would stop the velocity of the water and cause it to change or run in a different direction. The water flows slower through the concrete channel than it does through the tunnel and this is caused by reason of a greater grade in the Tunnel which was put there in order to deliver a certain amount of water with a small cross section tunnel, which results in the velocity necessarily being increased to a very high point. When it reaches the mouth of the Tunnel it has room to slow up.

(1711) The velocity of the water through the concrete approach to the flume, and through the flume itself, has been greatly reduced, due to increase in the cross section of the channel. This reduction in the velocity tends to increase the facility for actual measurement of the stream flow. The Parshall flume will measure correctly the water which passes through it and the velocity of the approach has no marked effect upon it under ordinary field conditions, though a highly excessive velocity might affect the reading of the flume, such is not the case in this installation. While I would not say that the installation at the Laramie-Poudre Tunnel is an ideal one, I do say that it is within practical limits of accuracy. I would say (1712) that it would be impractical to deliver the water from the tunnel into a straight channel without having any right angle turn. The meter notes appearing on sheets 1 and 2, dated June 11, 1933, were the results of current meter readings made by Mr. McGraw and myself on that date.

Mr. Greenwood: That is all.

[fol. 1051] E. B. House, witness for defendant, recalled:

Direct examination.

(1713) By Mr. Shrader P. Howell:

My experience in connection with the measurement of water and determination of the discharge from canals and the run-off from streams began about 30 years ago when I was stationed at Chambers Lake observing and reporting and measuring the quantity (1714) of water being discharged from the Skyline Ditch, the Michigan Ditch and the

Grand River Ditch, all of them trans-mountain ditches bringing water from other watersheds into the Cache la Poudre River. At that time I was working under the direction of Professor L. G. Carpenter, then State Engineer of Colorado. I placed automatic registers on all of those ditches and reported to the State Engineer from time to time throughout the season. I have since done a lot of work in the measurement of streams on the Big and Little Thompson, the St. Vrain, the South Platte, the Cache la Poudre, the Colorado River, the Uncompahgre, and practically all over the state. I am familiar with the measuring devices installed at all of the trans-mountain diversions from the Laramie River into the Cache la Poudre, having been at the Tunnel a number of times since its construction, in addition to the time spent at the Skyline Ditch (1715) many years ago. I designed and superintended the construction of the rating flume at the Sand Creek Ditch and located that flume in its present position. The rating flume at the Skyline is a timber structure with vertical sides and a flat bottom. It has the usual gauge rods, one of which is in the stilling well on the north side of the flume and one in the flume itself. I would say the flume is about 15 feet wide and 20 feet long, located in a straight section of the ditch both above and below. There is a Bristol automatic register installed, this being one of the most popular types of (1716) automatic registers. It is my opinion that the equipment and recording devices are [fol. 1052] adequate in every respect to assure proper measurement of water passing through the flume. The rating curve used in connection with the rating tables for that flume is a good curve and the register charts on file in the State Engineer's office furnish good record within practical limits of accuracy of the flow of water from the Skyline Ditch. Occasionally discrepancies are bound to occur at all automatic charts, but they will not be much (1717) in error, in my judgment, at any time. It is my judgment, based on my knowledge of the rating flume and of the automatic charts, that the water diverted from the Skyline Ditch can be determined within practical limits of accuracy.

I was at the Laramie-Poudre Tunnel on June 10th, 1933, in company with Mr. Potts, Mr. Tipton, Mr. Bull, Mr. Patterson, Mr. McAnelly and Mr. McGraw. With reference

to the delivery of water from the Tunnel, it discharges into what I would call a stilling basin, which is a concrete basin with vertical sides and a flat bottom, much larger than the portal of the Tunnel itself. The water (1718) is delivered from the Tunnel and expands with considerable turmoil in the upper part of this basin. I would say the basin is approximately 75 feet long. The water turns at an angle at the end of this basin and runs north for about 75 feet and at the lower end of this second section is a Venturi flume, which measures the water before it is delivered onto the rocky hillside, down which it flows entering the Cache la Poudre River about a 1,000 feet from where it is delivered through the flume. This measuring flume is sometimes called a Parshall flume and it works on the same principle as the Venturi flume. The stilling well is located at the side of the flume and is connected by boring a hole through the flume near the upper end of the throat so that the depth of water which is recorded by the automatic (1719) gauge is the same as the depth in the throat. At the time we visited the flume on June 10th, there was no gravel or rock or debris lodged in the throat of the flume. [fol. 1053] It is hardly possible that any debris might lodge there because the water goes through with high velocity and would carry away any debris which might come through. There was some deposit in the stilling basin at the portal of the Tunnel, but this deposit was above the mouth of the flume and far beyond the throat, at least 20 feet above the beginning of the (1720) flume. The right angle turn in the channel leading to the flume is about 80 feet above it, but in my judgment that turn does not affect the measurement of the flow of water through the throat of the flume for the reason that in the distance from the angle to the flume the water has ample opportunity to flatten out and the turmoil to subside, and by the time it enters the *the* contracting section of the flume it is stilled sufficiently so that the measurement is not affected. Neither would the gravel and debris above the flume affect the measurement of the flow for the reason that it (1721) has feathered out toward the lower end. It is my opinion, based on my observations at the time of my visit on June 10th, 1933, that the Parshall or Venturi flume at the outlet of the Tunnel was correctly measuring the flow of the water from the Laramie-Poudre Tunnel at that date, and

that the automatic registering device was correctly recording such flow at that time. On that same day, Mr. McGraw, Hydrographer for the State Engineer of Colorado, and Mr. Potts made meter measurements of the flow from the Laramie-Poudre Tunnel. I (1722) would say that these meter measurements were as carefully made as it would be possible considering the surrounding conditions. On that same day I had a conversation with the gauge reader at the Laramie-Poudre Tunnel and it is my opinion that he is thoroughly informed as (1723) to his duties and competent to discharge them. I have examined the automatic register charts of the Laramie-Poudre Tunnel on file in the office of the State Engineer, and it is my opinion that those charts constitute a record of the flow of water through the Laramie-Poudre Tunnel within reasonable limits of accuracy.

[fol. 1054] With reference to Defendant's Exhibits E-1, which is a rating curve for the Parshall flume at the Laramie-Poudre Tunnel, and Defendant's Exhibit V-1, being the meter notes and measurements of Mr. Potts of the flow through the Tunnel on June 10th, 1933, and Defendant's Exhibit W-1, which is meter notes of Mr. McGraw of his measurements on the same day, the measurements of both Mr. Potts and Mr. McGraw would plot on the rating curve Exhibit E-1 just a shade above the curve of the Venturi or Parshall flume. (1724) Mr. Potts' measurement at that time showed 91.95 second feet flow and the Venturi curve shows approximately 92.25 second feet, being a difference of .3 of one second foot. I consider that measurement to be remarkably close. Mr. McGraw's notes show a discharge of 100.7 second feet and the curve shows 103.5 second feet, a difference of approximately 2.3 second feet, which is also very close. The flow was increasing at the time of these measurements on June 10th, which is another reason that the meter measurements might be off, and I would not have been surprised had they differed from the curve by as much as 8 or 10%.

Referring to measurements 12, 18, 19 and 21 shown on Defendant's Exhibit E-1, and assuming that those measurements were (1725) off the curve as it has been stated in the evidence that such was a fact, in classifying the curve I would have ignored Nos. 12, 18 and 21, and would have drawn the curve just as it has been along the 15 other

measurements, and I would say that I would classify the curve as a good curve and properly drawn, and that the flume installed at the outlet of the Laramie-Poudre Tunnel is operating correctly and shows the amount of water flowing through the flume at a given time. It is my opinion that the Parshall or Venturi measuring flume and the automatic register charts on file in the office of the State Engineer for Colorado give sufficient information to enable one [fol. 1055] to ascertain the discharge of water through the Laramie-Poudre Tunnel within practical limits of accuracy, and that this information can be obtained from the records on file in the office of the State Engineer.

(1726) With relation to the Sand Creek measuring flume and the automatic register there, this is a concrete structure about 20 feet long and 15 to 16 feet wide, with vertical sides and a flat bottom. The structure is placed in a straight section of the ditch and is, in my judgment, located in the best position possible.on that ditch. It has a standard gauge rod, stilling well and a Bristol automatic register installed. I have made check measurements on (1727) Mr. McAnelley's rating in the latter part of 1922. At the time I made the check measurements I found the gauge height to be 1.55 and the discharge according to my rating was 39.86 second feet. My second measurement on the same day showed the gauge height to be 1.6 feet and the discharge by the meter measurement 42.24 second feet. The comparison with the McAnelly table showed that they were practically the same. I have examined the automatic register charts from the Sand Creek rating flume on file in the State Engineer's office, and it is my opinion that those charts constitute a fair record of the water diverted through the Sand Creek Ditch, I find that there are some omissions, but I believe they will represent within reasonable limits the actual stages of the ditch from time to time, and it is my opinion that a reasonably close estimate can be made of the amount of water delivered through the Sand Creek Ditch. On (1728) June 11th, 1933, we left the Sand Creek flume and drove north into the Chimney Rock country, observing the flow of Sand Creek first at the Running Water Ranch and continued north into Wyoming, and observed the flow of Sand Creek at the Lundquist ranch, and I measured the depth of water at a number of places along Sand Creek and estimated the velocity, and

[fol. 1056] it is my opinion that there was about 50 second feet of water in Sand Creek at the Running Water Ranch and about 60 to 70 feet flowing at the Lundquist Ranch. (1729) When I testified as to the old chart or rating table, I had in mind the McAnelly rating table for the Sand Creek Ditch prepared in 1922. The other rating table referred to an old weir located at an entirely different place and one which has since been destroyed. I saw the McAnelly rating table of 1922 in the State Engineer's office.

On my trip down Sand Creek on June 11th, 1933, I noticed several meadows below the Colorado-Wyoming State line in Wyoming (1730) which were being irrigated and from my observations at that time there was ample water for all who might desire to irrigate in Wyoming along that Creek, and the diversion by the Sand Creek Ditch above apparently did not restrict the use for irrigation below.

Direct examination continued.

By Mr. C. D. Todd:

I designed and superintended the construction of the Sand Creek flume in 1922. It was a solid, substantial flume and is still in use and is in about the same condition as it was when constructed so far as I can see. I also constructed the dam and headgates of the Sand Creek Ditch and the last time I saw them (1731) about two years ago they were in very good condition. I was the engineer employed to make the survey and stake the ditch for the Dead Man Ditch or the Wilson Supply Ditch. This ditch was originally designed for a 4 foot width on the bottom and a carrying depth of 3 feet. That is rather a great depth for a narrow ditch and as a consequence there was considerable trouble with the banks breaking and in addition storms would wash material into the ditch, thereby decreasing its carrying capacity. That is a usual condition in all mountain ditches, and in order to correct that condition as far [fol. 1057] as possible, I was employed to change the ditch to one 6 feet wide on the bottom, with a carrying capacity of 2 feet in depth. (1732) This change would not operate to discharge more water for the ditch 4 feet wide and 3 feet deep would carry more water than one 6 feet wide and 2 feet deep. This change was not made for the purpose of enlarging the capacity of the ditch, but rather for

the purpose of widening and strengthening the lower bank. All ditches require cleaning more or less each year and that is particularly true of mountain ditches.

(1733) Cross-examination.

By Mr. James A. Greenwood:

I was not at the headgate of the Wilson Supply or Sand Creek Ditch on June 11th, 1933. We went down Sand Creek into Wyoming to the point where the Sand Creek road connected with the Tie Siding road, which was the point where we crossed Sand Creek on our way east.

[fol. 1058] George M. Bull, witness in behalf of defendant:

Direct examination.

By Mr. Shrader P. Howell:

(1734) I reside in Denver, Colorado where I have been a resident since the fall of 1906, with exception of three years when I was in Chicago and Philadelphia. I am a Civil Engineer and am Consulting Engineer for the Water Board, of the City and County of Denver, and report to the Water Board on various construction projects. In general I have charge of all work in connection with the Water Board Department having to do with the water supply for the city, especially in regard ot trans-mountain diversions, both in connection with the necessary hydraulic studies, and the plans for the supervision of works.

I was graduated from the Rensselaer Polytechnic Institute in 1897 with the degree of Civil Engineer. After graduation I was employed on Canal construction work in New York State and later by the Chicago and Northwestern Railroad, and was in charge of the party locating and constructing the foundations for the Boone viaduct near Boone, Iowa. I was deputy City Engineer in charge of construction of pavings, sewers and other municipal structures, and later, on the construction of a new water supply for the city, reservoirs, pipe lines and so forth. I was later employed by the State of New York as one of the Resident

Engineers on the New York State Barge Canal, and was in charge of preparing plans for the Champlain division, which consisted of canalizing the Hudson River from Troy, and the construction of the canal from Fort Edward to Whitehall, New York. Later I was employed by J. G. White and Company of New York, with their Hydraulic (1735) department and my work was mainly in Mexico [fol. 1059] and Arizona and places of that kind, in connection with the study of water supply and other elements of value, that went with the development of water power. In 1906, I came to Colorado as Resident Engineer for White & Company, in connection with the construction of the Stanley Lake dam, which is located about 12 miles North of Denver. My work in that connection included the designing of all the structures, surveys, and (1736) studies of water supply and the detail survey on the western slope for the development of the water supply. We also established at that time the river gagings on those streams, that have since been kept by the Geological Survey.

I later spent a year with Arnold & Company of Chicago, where my work consisted of making an investigation of irrigation projects and organization of various engineering crews. In 1910, I came to Denver, and established my own office, and later was employed by the City and County of Denver in connection with the purchase of Lake Cheesman, and Antero Reservoir. During that period I did some investigating work in all the Western states, except California and Washington.

During the World War I had a commission in the Civil Engineer Corps of the United States Navy, and was in charge of the contract work on the rebuilding of the Philadelphia Navy Yard. On my return to Denver, in 1920, I was regularly employed by the Board or Water Commissioners as Consulting Engineer, and the first work I undertook in that capacity was a study of the city's water supply which it then owned, and a study of what should be done in the way of reservoir construction on this side of the Divide, and I worked up (1737) possibilities of the development of water from the Blue River, Williams Fork and [fol. 1060] the Fraser, which are trans-mountain diversion projects. I also designed and supervised construction of the Eleven Mile Canon dam, and am now supervising

construction or the changing of the Moffat Pioneer Bore into a water tunnel.

The Eleven Mile dam, and the use of the Moffat Tunnel water bore are both projects undertaken for the purpose of supplying water for the City of Denver.

I am familiar with the system of water administration in the State of Colorado, and particularly the system which (1738) prevails in the Cache la Poudre Basin. The state is divided into certain water divisions and districts. Each of those districts has a Water Commissioner, who has a list of various adjudicated priorities, and the amounts of such water that can be distributed for irrigation and other purposes. He is working through the Division Engineer, who is directly under the State Engineer. As the water supply of the river diminishes in quantity, and there is not sufficient water for all users to be served, the Water Commissioners shuts down the various ditches in order to supply those having senior rights. This calls for demands of water from one district to another, and the automatic control of the stream. The Cache la Poudre district is slightly different in its administration, for the reason that agriculture is very highly developed and the economic use of the water is such that ditches are permitted to store water at various times and transfer that water back to the river in order to have (1739) a more perfect and efficient use of the water supply. This of course is done under the direction of the Water Commissioner the same as in any other district.

[fol. 1061] I believe that the Cache la Poudre district is generally conceded to be the most highly organized and the most cooperatively and efficiently operated of any district in the State. That is due to local conditions that make such an operation possible, and also to the fact that the country is very highly developed and is utilized in the irrigation of very high grade of crops. The Skyline Ditch, the Larimie Poudre Tunnel, and the Sand Creek Ditch, diverted water from the Laramie River to the Cache la Poudre. Their operation is such that in each case the water that they develop and bring into the drainage area, does not immediately enter into the tracts of land for which they supply the water, but has to enter a main drainage area and become a part of the entire stream, and then to be rediverted for the use of those appropriating the water. I

became familiar with those various ditches through my general knowledge of the state and also by reason of my membership on a Committee of the Chamber of Commerce that was called in to look the (1740) Greeley Poudre project over to see if there was any financial aid that could be given to that development.

The other two canals, the Skyline and the Sand Creek I never visited, although I knew of them, until the 10th and 11th of this month.

I was a member of the engineering party concerning which Mr. Potts and Professor House have heretofore testified in connection with the investigation made of those several canals on above dates. I looked these canals over and was present when Mr. Potts and Mr. McGraw made their various measurements. The measuring devices on these several ditches are the same devices that we ourselves [fol. 1062] used on the Denver Water System. The Parshall flume is almost identical except in size, with one or two that the city has, the only difference being the city has a straight entrance from the channel to the flume, while there is a right angle turn in the Parshall flume used at the mouth of the Poudre Tunnel. The rating flumes that are at the Skyline Ditch and the Sand Creek Ditch are practically (1741) the same type as those used by the City of Denver.

As to your question as to the adequacy of the measuring devices on those several ditches, the best test is how they are answering the actual conditions of operation. There is a peculiar condition in the use of water on the Cache la Poudre, in that the system of exchange and storage is so complicated that you might say that the water users of the Cache la Poudre Valley are "water measure minded." There are not, at least in Colorado, any communities where there is the intelligent consideration of water measurements and the value of water as exists in that place.
(1742) The water is so valuable in that section that when any new water supply is brought in like the Sand Creek, or Cache la Poudre, it is of vital interest to everyone that the water be measured in such a way that it satisfies the various users.

If we assume, for instance that water was coming in from the Cache la Poudre Tunnel, the man owning that water must, in order to protect his own interests, secure a rating

close to what he actually brings in, or he is making a contribution to the river. Those numerous ditch companies throughout the Cache la Poudre River, and if they allow some water to be brought into the system, and it is overestimated the water would be taken out of their supply. For years and years there has been practically no conflict [fol. 1063] among the users in the Cache la Poudre Valley as to the distribution of this supply. In other words, the users check on one another so that I would say that the general administration of that district has shown that all of those systems must be within practical limits of giving the proper quantities of water.

(1743) It is my opinion based upon observations and experience that the measuring devices on these several ditches ought to be checked very carefully in the spring against freezing and frost, and also there should be a very careful and systematic metering of those devices because of possible deposits of sand and if so I would say that they are proper and adequate measuring devices and they compare favorably with similar devices maintained with the Water Board of the City and County of Denver.

(1744) The Denver Water Board make use of some 80,000 acre feet in the City of Denver proper, and in measuring the usual diversions from the river, as far as our storage reservoirs are concerned are either rating flumes or weirs. I am familiar with the method employed to irrigate native hay meadows, since the City's Antero Reservoir is in the midst of the meadow lands, and I have also been through the meadow lands in the Laramie River Basin of Colorado upon a couple of occasions. I was up there several years ago and on one trip spent a day and again rode through the meadow lands on the 11th of this month, with a party of engineers to whom I have heretofore referred.

(1745) The general topography of the meadow lands in the Laramie Basin, is thta there is a thread of native hay land extending down from a point below the Cache la Poudre Tunnel to the State line, which is very narrow. There is only a fraction of a mile on each side of the river, being wider in some places and narrower in others and as a whole the country is sloping, compared with the hay lands [fol. 1064] in the South Park for instance. I was making a comparison with the Laramie River as one continuous narrow thread, and with rather comparatively steep slopes

to the stream. Very few of them are flat. The lands lie right along the stream. The hay lands were being irrigated at the time of our trip to the Laramie River Basin, and the method being used is the same that is used in South Park section; that is, there is a ditch on the high ridges of the land, and the land is covered with a sheet of flowing water, which descends toward the stream and that which is not actually consumed by evaporation, goes back into the stream.

(1746) In irrigating native hay by the flooding system you have to divert from the stream not only the water that is consumed in the actual raising of crops, but an additional amount of water which is a common carrier, you might say, which takes the water from the stream and deposits it on the land and then the common carrier of the water either returns it to the stream from which it came or any other water course to which it might go either by surface flow or percolation. In other words you cannot deposit the exact amount of water in a field for a growing crop without carrying with it sufficient additional water to convey the water used in growing the crop. Now, if you only had an acre foot of water per acre to raise native hay, you would either have to take all of your water and put it on a very small piece of land, or not irrigate the land at all, because you could not get the water to the land to raise the hay unless you had additional water to divert.

(1747) If there should be a limitation of one acre foot per acre of native hay land in the Laramie River Basin in Colorado, you could either raise a small acreage of hay properly, or you would not be able to raise any hay at all. The lands would either go back to dry pasture, or some bottom lands, [fol. 1065] which you could raise a little hay on, but ordinarily your operation of raising native hay would cease. Such a method would practically amount to abandonment of raising native hay in that section and that I believe is practically the only crop raised in the Laramie River Basin in Colorado. In my testimony I have used the expression "Cache la Poudre" Tunnel, but by that I mean the Laramie-Poudre Tunnel.

Mr. Greenwood: I don't believe there is any cross-examination, Mr. Bull.

[fol. 1066] BRUCE G. EATON, witness in behalf of defendant, recalled for further direct examination:

By Mr. C. D. Todd.

(1748) I have heretofore testified in this matter. After we had built the Sand creek ditch system, I bought 2 ranches in Wyoming with certain appropriations of water and ditches for irrigating the same; I bought them from Mr. Hardman and his wife, and Mr. Cunningham; I bought the Cunningham ranch through an intermediary, Mr. Hoge, who did all the buying and made all the deal, all the way through; I did not see either one of the owners. After acquiring the lands and ditches and the water, I sold the land and retained the water rights. Mr. Hoge sold the land for me. The deeds reserved all the water rights, the appropriations that they had for this land. The ditches and appropriations of water that I bought were the James Hardman No. 2, with 1.81 sec. feet of water, and the Davis Brothers No. 2 and Alice Hardman ditch, with (1749) 4.57 sec. feet of water, and also the Davis Brothers Sand Creek No. 2, from the Hardmans, with 1.81 sec. ft. of water. And the LeRoy ditch from Peter Cunningham, with 8.64 sec. feet, making a total of the 4 ditches 16.82 sec. feet of water.

(Thereupon Defendant's Exhibits X-1, Y-1, and Z-1, were marked for identification, and were later offered in evidence.)

Exhibit X-1 is a deed from Peter Cunningham and Minervera Cunningham, his wife, to James M. Hoge. I do not know whether he was the original appropriator, but he had it at that time. This deed conveys all of sec. 26 and N. E. ¼ of sec. 24, in Tp. 14, N. R. 75, Albany Co., Wyo., together with all the improvements and appurtenances, including among other things, all fences, water rights and ditches, situate upon or used in connection with said (1750) lands or any of them, also all the right, title and interest in the certain irrigation ditch known as LeRoy Ditch; this deed is dated Feb. 3, 1906, and was recorded in Albany county, Wyoming, May, 1909, in book R-1, of Deeds, p. 245. Mr. Hoge subsequently conveyed that land and the LeRoy ditch appropriations of water to me.

This conveyance was made by the deed, Defendant's Exhibit Y-1, which is a deed from James M. Hoge to Bruce G. [fol. 1067] Eaton; the consideration was $7,000. The description of the land, ditch and water rights is exactly the same as in previous deed, Exhibit X-1, and it was recorded in the office of the county clerk of Albany county, Wyoming, on May 7, 1909, in book R-1 of Deeds, at p. 246. These two deeds refer to the LeRoy ditch transaction.

Defendant's Exhibit Z-1 is a deed from James Hardman and Alice Hardman, his wife, to Bruce G. Eaton, and the consideration is $8,500. It conveys W½, and W½ of E½ of sec. 2, and all that part of N½ of sec. 11, all in Tp. 13, N. R. 75 W. of 6th P. M. The part in sec. 11 is given by metes and bounds description. After describing the land the deed describes the improvements, ditches (1751) and water rights as follows:

"Also all buildings and improvements, situate upon said lands and all water rights connected with the same, or with the general ranch premises of the parties of the first part, also all fencing and inclosures, connected with said general ranch premises, and included among other things, the following ditches and the water rights belonging to the same to wit: The James Hardman No. 2 ditch, The James Hardman No. 1 ditch, the undivided interest of James and Alice Hardman in the Davis Brothers No. 1 ditch, and in the Davis Brothers No. 2 ditch, hereby releasing and waiving any and all rights, under and by virtue of the homestead exemption laws of the state of Wyoming."

(Defendant offered in evidence said three deeds, Exhibits X-1, Y-1, and Z-1.)

I subsequently sold and conveyed these lands and the ditches as such and reserved the water rights.

(Defendant then had marked three deeds A-2, B-2, and C-2, for identification purposes, and were later offered in evidence.)

Defendant's Ex. A-2 is deed from Bruce G. Eaton to Lemuel E. Cook, dated Nov. 24, 1906. The consideration is $1,000, and is recorded in Albany county, Wyo., Nov. 29, 1909, in book R-1 of Deeds, p. 283, and the property described is as follows:

"The N. E. ¼ of section 24, Tp. 14, N. R. 75 W. 6th P. M. Together with all the improvements and appurtenances. Excepting and reserving, however, unto party of the first part, his heirs and assigns, any and all water rights belonging to the party of the first part and heretofore connected with said land or any part thereof."

(1752) Defendant's Ex. C-2 is a deed from Bruce G. Eaton to M. J. Hoge, consideration $2,560, dated Apr. 10, 1907, recorded June 22, 1907, Albany County, Wyo., book R-1 [fol. 1068] of Deeds, p. 124, and the property described is as follows:

"All of sec. 26, tp. 14, n., r. 75 west 6th p. m. together with all the improvements and appurtenances, including among other things all fences and ditches situate upon or used in connection with said lands, or any of them, and especially all the right, title and interest of the party of the first part in and to that certain irrigating ditch known as the LeRoy ditch. Excepting and reserving, however, unto the party of the first part, his heirs and assigns, any and all water rights, belonging to the party of the first part, and heretofore connected with said lands, or any part thereof."

In these two deeds, A-2 and C-2, they cover the lands, water rights and ditches, obtained from Cunningham.

(1753) Exhibit B-2 is a deed from Bruce G. Eaton and Mary H. Eaton his wife to Franklin P. Mason, dated Dec. 20, 1907, and recorded in Albany county, Wyo., Jan. 10, 1908, in book R-1, p. 154, and describes the land purchased from Mr. Hardman, being

W½ and W½ of E½ of sec. 2, and all that portion of N½ of sec. 11 (described by metes and bounds) all in Tp. 13, N. R. 75 W.; together with all improvements and appurtenances including all water rights from Spring creek; but reserving unto the parties of the first part, their heirs and assigns, any and all water rights belonging to the parties of the first part heretofore connected with said land, or any part thereof."

The ditches and water rights reserved are those mentioned in the deed from Hardman to Bruce Eaton, set forth

in defendant's Exhibit Z-1, and are herein set forth in full at page 1751 of this abstract, supra.

I paid $15,500 for these lands, water rights and ditches, and I sold the land, and reserved the ditches and water rights for $5,000, and the difference $10,500 was cost of water. Defendant offered in evidence, said Exhibits A-2, B-2, and C-2. After (1754) I had sold lands without water I diverted the water from Sand Creek every year, without any complaint from anybody. I changed the point of diversion from the original ditches to the Sand Creek ditch system. By these deeds the title to the property was vested in me personally, and I subsequently made a deed of the water rights which I had reserved to the Divide Canal and Reservoir Company, that for many years had owned The Wilson Supply or Sand Creek system.

(Thereupon a deed was marked Defendant's Exhibit D-2, which was later offered in evidence.)

[fol. 1069] This deed is dated Jan. 2, 1920, and is from Bruce G. Eaton, and his wife, Martha L. Eaton to the Divide Canal and Reservoir Company, and the same was recorded in Albany county on Jun. 9, 1933, in book No. 7, Water Appropriations, p. 285. This deed conveys all the following described ditches and interest in ditches, water rights, and appropriations of water pertaining thereto, particularly in Albany county, (1755) Wyo., to wit:

"All the right, title and interest in and to the following irrigation ditches, taking water out of Sand Creek, and its tributaries, in said County, and also the appropriations of water, as follows, viz:

"The interests of first party in and to that certain irrigation ditch known as the LeRoy Ditch, and the appropriations of water allowed and decreed thereto, under the name of Peter Cunningham, as of the date May, 1885, in the amount of 8.65 cubic feet of water per second of time, and which by mesne conveyances has vested in the party of the first part.

"Also the interests of first party in and to that certain irrigation ditch known as the James Hardman No. 2 Ditch and the appropriations of water allowed and decree thereto under the name of James Hardman, as of the date of May, 1878, in the amount of 1.81 cubic feet of water per second of time, which by mesne conveyances has vested in the parties of the first part.

"Also the interests of the parties of the first part in and to that certain irrigation ditch known as Davis Brothers Ditch No. 2 and Alice Hardman Ditch, and its enlargements, and the appropriations of water allowed and decreed thereto as of the date of August 8, 1891 in the amount of 4.57 cubic feet of water per second of time, which by mesne conveyances has vested in the parties of the first part.

"Also all the interests of the parties of the first part in and to that certain irrigation ditch known as Davis Brothers Sand Creek No. 2 Ditch, and its enlargements, and the appropriations of water allowed and decreed thereto, under the name of Alice Hardman, as of the date of Nov. 26, 1894, in the amount of 1.79 cubic feet of water per second of time, and which by mesne conveyances has vested in the parties of the first part.

"The parties of the first part hereby intend to convey and do hereby convey all their right, title and interest to the LeRoy Ditch, and its appropriations of water conveyed to Bruce G. Eaton, by James M. Hoge, by deed dated Feb. 3, 1906, and recorded in the office of the county clerk of Albany County, Wyoming, May 7, 1909, in book R-1 of Deeds, p. 246

"Also the parties of the first part hereby intend to convey and do convey all their right, title and interest in and to the James Hardman No. 2 Ditch, the James Hardman No. 1 Ditch, the Davis Brothers No. 1 Ditch, and the Davis Brothers No. 2 Ditch, and all appropriations of water therefor, which are described and intended to be conveyed, and were conveyed to them in that certain deed from James Hardman and Alice Hardman, to Bruce G. Eaton, dated March 30, 1906, and recorded in the office of the county clerk of Albany County, Wyo., on May 1, 1909, in book R-1 of Deeds at page 244.

"To have and to hold the same, together with all and singular the appurtenances and the privileges, thereunto belonging, or in anywise appertaining, and all the estate, right, title, claim and interest whatsoever of the said parties of the first part, therein or thereto, either in law or in equity to the only proper use, benefit and behoof of said party of the second part, its successors and assigns forever."

(Exhibit D-2 was offered in evidence.)

[fol. 1070] (1756) Cross-examination.

By Mr. Greenwood:

I did not file *file* or offer for filing the deeds to myself from these grantors named in Exhibit X-1, Y-1, and Z-1, or the deeds from yourself as grantor, Exhibits A-2, B-2, and C-2 with the state engineer of Wyoming, or the present State Board of Control at any time. I bought these lands through Mr. Hoge and he was to do all the work. I have no personal knowledge whether the state officials of Wyoming were officially advised of these transfers or not.

Rex C. Eaton, witness in behalf of defendant, recalled.

Direct examination.

By Mr. C. D. Todd:

I have heretofore testified in this case. I have heard the testimony of my father about the acquisition of the LeRoy and other ditches and lands and the re-sale of the lands with the reservation of the water rights. I have heretofore stated that I had been in actual management of the affairs of The Divide Canal and Reservoir Company since 1917. As such I was familiar with the diversion of the water up there on The Wilson Supply and Sand Creek System; we have diverted the 16.82 sec. feet of water the appropriations of those four ditches at the headgate of the (1757) Divide Ditch since I took charge.

[fol. 1071] Lewis L. Stimson, witness in behalf of defendant, recalled:

Direct examination.

By Mr. Todd:

(1757) I have heretofore testified in this case and there stated my knowledge, schooling and qualifications as an irrigation engineer. I am familiar with the ditch or system of ditches known as The Wilson Supply ditch, sometimes called the Sand Creek (1758) Ditch System.

The lower part, or Sand Creek to Sheep creek, is sometimes called the Divide ditch or the Sand Creek ditch, and the upper part, from Sand creek to Deadman creek, and above Deadman creek is known and designated as Deadman ditch, and above Sand Creek also as the Columbine Extension Ditch, or continuation of the Deadman ditch. I have known of the ditches and the corporation for a great many years, but I have never been intimately connected there with until about the 20th of May, 1933. About the first of May, 1933, The Divide Canal and Reservoir Company, owner of this system of ditches, employed me to go upon the ground and make investigation of their ditch system in Colorado; and also to go upon the ground and make an investigation of the various ditches taking water from Sand Creek in the state of Wyoming. In making such investigation I had with me two assistants; one of them was Mr. Moody, my partner in business at Greeley, and the other my son, Lewis, who was with me, too. I have known Mr. Moody and his ability as a civil engineer and hydraulic engineer and that he has been in the irrigation engineering business to my knowledge (1759) for twenty to twenty-five years. I have been associated with him for about 12 years. He is a very expert man in the handling of water matters. My son's name is Lewis Stimson. He is a graduate from the Agricultural College in Ft. Collins, Colo., as an irrigation engineer, in the year 1932. He has been connected with me and worked with me and assisted me since about 1925 as my assistant and helper. From my knowledge and experience of his attainments I would say that he [fol. 1072] is a competent and proficient engineer. Both of them went with me and worked with me in the investigation which I made on Sand creek, both in Colorado and Wyoming. I went up there first on May 20, 1933, and in going there I went by Tie Siding and over to what is known as the Tie-Siding-Boswell road, which cuts about the middle of the Sand Creek stream in Wyoming, and turned off at the Boswell camp, on (1760) up to Sand Creek, to a place known as Running Water Ranch; that is up about 3 miles of Chimney Rock, or north of the Colorado-Wyoming line. My investigation of Sand creek there showed me that there was so much water that it would be impossible to make any investigation on Sand Creek in Wyoming as to the amount of water being run in the ditches. I measured

the water at the bridge on the Running Water Ranch and found 232 sec. feet of water there. I then came on up Sand creek to the Eaton Ranch or Camp at Wooster Reservoir, which is in Colorado; we were able to drive the whole distance that far; we were not able to drive any other place, however. There was so much snow that it was impossible to get to the head of the Divide ditch, and it not being feasible to make an investigation at that time, I came home. At that time the men were trying to open the ditch from Sand Creek to Sheep creek; they were digging snow out of the ditch; I was not able to get to the head of the ditch, but the part I saw was full of snow, and it was impossible to run any water. As a matter of fact there was no water to run because it was (1761) frozen up. I ascertained from the men there working on the ditch that there was no water running in Sand creek at the diversion dam of The Wilson Supply ditch, because it was frozen. Everything was frozen up there, at that time. At the elevation of the Sand Creek ditch it was frozen. That ditch is at an elevation of about 8900 feet, and there was no run of water at that elevation anywhere's. Down at the Running Water Ranch the snow had melted and there was 230 sec. feet of water running in the creek. At that time there was not a great deal of snow in Wyoming, but in Colorado, there was a great quantity of snow. There was drifts of snow [fol. 1073] as deep as 10, 12, or 15 feet. Not being able to do much investgiation work I came home to Greeley. I went up again on May 30, 1933, and Mr. Moody and my son went (1762) with me. When we arrived there conditions had improved. The amount of water in Sand creek at Colo.-Wyo. line had fallen to about 70 feet, and it was then feasible to make investigation; but on going up Sand creek to the Eaton Camp at Wooster reservoir I found the conditions up there were not so good, but I was able, by walking some four or five miles, to get to the weir on the Divide, and I found that the men had succeeded in shoveling a trench through, but there was no water running; that is the ditch was still frozen at the head, and no water was running; I followed down to where it goes into Sheep creek, and there was no running water. We were there from May 30 to June 6th, 1933. The weather conditions were good, and insofar as running water conditions were concerned on the Laramie plains, down on Sand creek, they were good.

The snow was all gone, and the creek was running water and the ditches were taking it.

(1763) The snow was all gone from the land adajacent to Sand creek in Wyoming; just over the line in Colorado there was a number of miles that Sand creek was open, and running a good volume of water, but at the head of the Divide ditch, they did not succeed in opening the ditch, and running water through it, until sometime, about June. 3. While there we made an investigation of the meadow lands, rated the streams and ditches, and things of that character. The first thing I did was to find a section of Sand creek, above all of the irrigation in Wyoming, where I could establish a measuring station, to determine how much water was actually coming into Wyoming from Colorado. Then I proceeded to measure Sand creek, and on going down Sand creek measured each of the ditches that came out of it, and established other measuring stations down the creek, one to check how much water was being diverted from the stream; and how much remained at these various measuring stations that I established, and I proceeded with that work until I had measured all the ditches that came out of [fol. 1074] of Sand creek and the water that remained in Sand creek. I established 7 of these stations, and marked them A, B, C, D, E, (1764) F and G. I not only examined the various ditches that diverted the water from Sand Creek into Wyoming onto the meadow lands there, but I also actually measured the amount of water that each of them was drawing from Sand creek. As to the area of land being irrigated there was some land that was being irrigated that had no record of the ditch that irrigated it, nor the amount of land that was being irrigated, and those lands I actually measured. Along about 1903 I think a man named Hoge, that lived there, and Mr. Zac Duvall, who was an engineer of my acquaintance, measured the lands that were being irrigated at that time from these ditches, and I had the map that he prepared, and the area of land, and I went over these lands, and compared the lines of ditches and land line, with information shown on this map, and from those two sources of information I found that the total irrigated land on Sand creek in Wyoming was approximately, probably not exactly, 2980 acres. I have not been able to make up a table showing the amount of land claimed in their decree for thees ditches compared with the

amount of land actually irrigated. I have not yet had (1765) time to do that. As a part of our investgiation and the making of records of what we found, we made a map of the portion of Sand creek in Wyoming, and the location and the amount irrigated by various ditches, taking water from Sand creek in Wyoming.

Thereupon two maps were marked defendant's Exhibit E-2 and F-2, which were later offered in evidence.

The Exhibit E-2 is a map showing the Sand creek lands irrigated, and the ditches in Wyoming. The other map, Exhibit F-2 is a map of Sand creek in Colorado and shows the Wilson Supply ditch, and the Eaton reservoir, sometimes called the Wooster reservoir; it also shows the line of Sand creek in Colorado; also Sand creek ditch or the Divide ditch, from the point of diversion on Sand Creek, over into Sheep creek. The line marked 'Sheep creek' indicates the course of 'Sheep creek' which takes the water down into the Wooster reservoir. It is a tributary of the Cache la Poudre river. That part from the end of the [fol. 1075] Sand creek ditch shown on the map (1766) and continuing down into Cache la Poudre valley, is located in water district No. 3; above that shows the part of it that is located in water district No. 48 of the state of Colorado. Sand creek itself is in district No. 48. By reason of haste in getting things ready on such short notice I desire that these two exhibits be withdrawn in order to make blue prints and substitute for the original tracing, which was done. Explaining in more detail the things shown on the map, Exhibit F-2, being a map of the portion of Sand creek in Colorado, and the ditches connected therewith I will say: that starting at south end of map there is shown what is called 'Columbine ditch' and the 'Deadman ditch'; the southerly end of Deadman ditch would be properly called the "Columbine Extension ditch' and that is the portion or section of Deadman ditch called in the complaint herein 'The Deadman Extension Ditch'. This map shows the Deadman ditch, and the Deadman Extension ditch, and the Columbine Extension, and all except the Columbine ditch, is marked Deadman ditch. This map shows how the water is brought from Deadman creek and its tributaries, into Sand creek; and after in Sand creek it runs down a number of miles to the dam and headgate of the Sand creek

ditch, and there it is diverted from Sand creek and taken over the Divide into Sheep creek, which puts it into the Cache la Poudre drainage. (1767) In sections 22 and 23 where the Sand creek ditch crosses the Divide, the distance between Sand creek and Sheep creek is about 1½ miles; you can stand on mountain between and see both creeks. In an air line they are probably not more than a half a mile apart. It is possible to construct a ditch from Sand creek to Sheep creek, but there is a tunnel for perhaps 100 feet long. From the point where the Deadman Ditch joins headwaters of Sand creek in section 15, is a natural stream called Sand creek; this creek is used as a conduit for carrying the water that is diverted from the tributaries of the Laramie river into Sand creek. From point of discharge or connection with Sand creek, the ditch is described as Deadman ditch; it intercepts Deadman creek and other creeks; those small creeks up there in the mountains do not seem to have acquired any definite names, and they [fol. 1076] are often given different (1768) names by different people. The map, Defendant's Ex. F-2 correctly describes various ditches, Sand creek and other creeks, at top of mountains where Deadman system begins, all in Colorado. I have examined map attached to amended complaint and made part thereof purporting to correctly set forth various ditches involved in this case. On that map we find the line marked 'Divide ditch' with a 'circle' and the figure '2'; that portion of ditch there described and shown is same portion of this ditch system shown on Ex. F-2 as 'Sand creek ditch'; farther down on map attached to complaint is a legend 'Wilson Supply ditch' ('Deadman feeder ditch') with 'circle 2' with line pointing north towards part of system just above described; the part there shown and (1769) described is same as south line of my map on which is shown 'Deadman' and 'Columbine' extension ditches; the map with complaint has a bracket connecting two portions of ditches above described, with a legend 'Sand creek system'; this applies to all of them; this map also shows line of Sand creek connecting Deadman with diversion dam in Sand creek; both this map and one I have prepared represent this ditch system, the surrounding country, and creek and other tributaries.

While making my investigations I inspected and tested the measuring flume on Divide or Sand creek ditch; I made

a thorough rating of measuring flume on that ditch to determine just how much water was carried, and to find out also whether or not the table that had been used, as I understood, for some years past, (1770) of that flume was correct.

I had a drawing made indicating or showing the flume itself. The drawing was made by Mr. Moody; he was with me at the time we made measurement. The drawing he made is an accurate representation and drawing of measuring flume in Sand creek ditch; I found that the flume was parallel with the course of the ditch, and was 16 feet long, and 15½ feet wide, and that the sides of flume were 5 feet high; the entire flume was made of concrete; it is a permanent structure; it is very well placed, and the measurement of water through it is accurate. This flume is what [fol. 1077] we call a rectangular flume, which means that the sides are at right angles to floor, and that it is same width at both ends. It is necessary to have it rated in order to prepare a table to show what water runs through it at various depths. In addition to this, it is equipped with a Bristol automatic register, to re- (1771) cord depth of water at all times that goes through flume.

This is an automatic registering device and contains a circular piece of paper on which a mark is made by pen that is operated by clock work; depth of water is shown by this pen by rising and falling of float that is in a stilling box beneath the register itself, and this stilling box is connected with measuring flume by a 2-inch pipe in this case. Part of this measuring device, the lower part, is housed in concrete, and the upper part has a wooden housing. Exhibit G-2 shows the housing on top of the concrete wall, and the course of water through flume from left to right is marked by an arrow; the walls of the flume are of concrete as shown in drawings; the drawing also shows a foot bridge at up stream side or end. I also made a rating of this flume at that time. I had a copy of the rating card showing rating of this flume made by W. J. McAnelly in 1922, which rating card has been frequently referred to in the evidence. As a part of my investigation, when I had rated the flume, I made a comparative (1772) table showing various depths and amounts of discharge under the McAnelly rating, and also depths and discharge under

my own rating. I made up this table on the 5th of June, 1933.

The McAnelly rating sheet or table showed depth of gauge and discharge only to a part of depth of flume, it carried it up to 2.6 feet in depth, and showed at that depth the discharge to be 95 sec. feet, and according to my measurement and table, it is 96 sec. feet. At the time I made my rating there was sufficient water in this flume to make an actual rating of water to a greater depth than shown on McAnelly rating table. On my rating there was water enough in flume so that depth thereof was 3.4 feet and flow or discharge 167 sec. feet. In making my measurements to ascertain velocity of the water flume at different depths, I used what is known as the two-tenths, eight-tenths [fol. 1078] (1773) system; that is recognized as probably being the best method. While making my measurements I had the water changed in depth so that I made measurements at six different depths in the 3.4 feet indicated on gauge rod. I prepared a rating table of my measurement or rating as compared with measurement and rating made by Mr. McAnelly in 1922. This table shows the gauge height and discharge of water at various depths of both measurements.

Thereupon a paper was marked as Defendant's Ex. H-2 and later introduced into evidence.

This Exhibit H-2 is a paper headed "Sand Creek Flume of The Wilson Supply Ditch", and on the left hand column is Mr. McAnelly's 1922 rating, and on the right hand column is Stimson 1933 rating, and at bottom is statement "Following ratings were made from which table was prepared." That means that the curve of this flume was developed from the six ratings shown at bottom of sheet. Each of these was taken by what was known as the two-tenths, eight-tenths method, all of them (1774) the same way. In comparing the ratings made by me and that on the McAnelly table, I found that the two tables practically correspond; at McAnelly's depth of 2.6 feet, he had 95 second feet and mine was 96 second feet, or only about 1% difference; that is a reasonable degree of diversion or difference between ratings on any flume. I would say that that flume is in good condition for the measurement of water and, in fact, is as good a rating flume as I have ever read. The flume is

located in ditch on same line as ditch for a number of hundred feet above, and a number of hundred feet below flume, and it is well located, and everything is in good condition actually to measure the water. As to fall of that ditch across there, I did not take the fall, but I judged from the flow of water it is from 10 to 15 feet per mile. I took some photographs showing flume and line of ditch on either side (1775) thereof.

A photograph was then marked Defendant's Exhibit I-2.

This exhibit is a picture of measuring flume on Sand creek. The picture was taken on June 5, 1933. This picture shows flume itself and considerable distance of ditch above. This photo also shows foot bridge across flume with a man standing on it. It is the same foot bridge shown on [fols. 1079-1081] drawing, Exhibit G-2. The photo, Ex. I-2, shows about 50 ft. of line of ditch above the flume and 100 feet below flume.

A photo was marked as Defendant's Exhibit J-2.

This exhibit is a photograph of a cut through the Divide between Sand creek and Sheep creek and is a part of the main ditch. It represents and indicates the ruggedness of the (1776) country and the turbulence of the water running in the ditch. This photo was taken about 400 feet above rating flume.

Defendant offered in evidence Defendant's Exhibit G-2, being a drawing of flume, and I-2, being photo of the ditch and flume, and J-2, being a section of the ditch. Exhibit G-2 being as follows:

Exhibit G-2 omitted. Printed side page 3125 post.

Also defendant offered in evidence Defendant's Exhibit H-2 which is in word and figures, as follows, to wit:

Exhibit H-2 omitted. Printed side page 3126 post.

[fol. 1082] (1777) There is a headgate located in the ditch at dam in Sand creek and it is what is called a Taintor gate. A photo of same was marked K-2, and witness stated that it is a photo of gate across Sand creek which is used to stop flow of water, and turn it into Sand Creek ditch; it is a very efficient sort of gate, and can be shut down to

retain water, and then raised to let water go by; the photo Ex. K-2 shows that this headgate is set in masonwork of dam.

Defendant offered in evidence said Ex. K-2.
Another photo was marked Ex. L-2.

This photo was taken by witness to show snow (1778) conditions at that time at and near headgate of Sand creek ditch. It was taken on June 5, 1933. In the foreground is headgate of Sand creek ditch and at one side shows a very heavy snow-bank.

This exhibit was then offered in evidence. Defendant then offered in evidence Exhibits H-2 and G-2, being drawings of flume and rating table, and also offered in evidence Exhibit E-2, being a map of section of Sand creek located in Wyoming, just north of Colorado State line, and extending down nearly to Laramie river, with the ditches, streams, and other matters indicated thereon. And also offered in evidence Exhibit F-2, being map of section of Sand creek ditches and streams in Colorado, and as to all of these maps and drawings asked leave to withdraw original for purpose of (1779) making copies.

Returning again to meadow land in Wyoming shown on Ex. E-2, as I have stated before that I established certain measuring stations along Sand creek to measure water. These stations are indicated on map, Ex. E-2, by a double circle with legend 'Water Measurement' with a letter to show station. My first measuring station was established a short distance over line in Wyoming, and is named 'Measuring Station A'; it is located in sec. 13. I established next station, 'Measuring Station B' in sec. 25 near head of Lone Tree ditch; the next one is in sec. 11 and is called 'Measuring station C'; it is by a bridge on county road; the next one is near the Cunningham house in sec. 26 and is called 'Measuring Station D'; the next one is just below (1780) the Nedart ditch and is 'Measuring Station E'. The next one is down west of the Creighton Lake, and is marked 'Measurement station F'; and the [fol. 1083] last one is down a short distance from Laramie river and is marked 'Measurement Station G'. I established these various stations for the purpose of ascertaining the volume of the water at various points. To establish them I found a straight section of the creek, and then I

stretched a tape across creek and measured depth at various places, in order to get a cross section of water, and I measured velocity of water with current meter, and last I marked station with wooden stake, with a notch in it, at exactly water line; that would be water line at time I made measurement, and would show data so that I could go back there and see whether or not there had been any fluctuation in water. I found a daily variation; I found lowest water was some time during early morning hours, and highest water was some time between 6 and 11 o'clock p. m. The weather was sometimes pretty warm and at other times was pretty cold; there was a good deal of fluctuation of water on the Sand creek flume, caused by freezing up (1781) of snow at night and melting in daytime. In order to explain my measuring system, and how I ascertain original quantity of water, and the additions from tributaries to Sand creek, and the reduction by diversion from the creek by ditches along entire length of creek as shown on this map E-2, I will say I can best do that by an illustration of one section, and the same method was applied on all of sections. Starting at water measurement station A near the state line I measured water at that place. Then coming down stream we came first to headgate of Collins ditch in sec. 13, about a mile below station A, and I measured amount of water being taken out of creek by Collins ditch; the next ditch down Sand creek is called the Collins No. 4, and I measured water in that ditch; the next on creek was Running Water Creek, a tributary and I measured amount of water in Running Water Creek. Collins No. 2 ditch comes out of another creek and I measured that; come on down still further I came to what is known as the Lindquist ditch; and I measured all of the water taken out of the creek by that ditch; down still further is the Knold ditch, and I measured all water there.

[fol. 1084] Further down I came to Lone Tree ditch and I measured water there and just below headgate of that ditch I established water (1782) measurement station B and I measured waters in creek there.

The reason I did that was because I was dividing the creek into such sections so as to make measurement of all ditches and measure all water in creek in one day. That was to avoid fluctuations that might occur on account of that night flow that comes up. Every other section was

measured in this same way, clear down to the point shown as water measurement station G on map. This station is a short distance from Laramie river. I made a table of my measurements from station to station, and the net results from station A to station B is as follows:

I found that the amount of water in Sand Creek at station A was 69.87 cubic feet per second; this was on May 30, 1933. I also found that Running Water Creek was bringing into Sand Creek 2.23 second feet of water, making total amount of water in creek, sections A to B 72.10 sec. feet. I found that Collins ditch No. 1 was diverting 13.64 cub. ft. and Collins ditch No. 4 diverted 7.83 cub. ft., and Knold ditch 8.4 cub. ft., which made a total diversion by the ditches in that station 32.87 second feet.

I then went down and measured all water in Sand Creek at the head of Lone Tree ditch and I found in the creek at that point 70.51 second feet. In other words the loss or diminution in waters of Sand Creek from section A to B was 1.59 sec. feet. Although four ditches above named had diverted 32.87 sec. feet. In (1783) ascertaining this I took original amount in Sand Creek at station A and added the inflow from one tributary and thus arrived at total waters of stream and then subtracted diversions made by four ditches aggregating 32.87 sec. feet, and then I took final measurement of creek at station B, and I thereby ascertained that there was a loss or diminution of flow in Sand Creek at station B to be 1.59 sec. feet. I account for this result by the fact that these diversions by said ditches are close to the stream and that the water used returned very quickly, and finds its way back to stream. A very large part of the return was water running on surface of ground, and the sub-soil is gravel and much of water re- [fol. 1085] turns through gravel. The meadows are irregular pieces of lands and are not smooth; they are cut up by depressions which lead back to stream, and when the water is (1784) turned out of ditches it finds its way into these depressions and then back into Sand Creek, as running water on surface.

The system of irrigating meadow lands along Sand Creek in Wyoming is, that they take all water that each ditch will hold and turn it on land, and let it run, go where

it will, and they apparently keep on doing that as long as there is any water.

Returning again to my statement concerning my measurements from station to station along Sand Creek I measured the other stations just about same as I did between stations A and B. I measured all of ditches that were taking water out of stream, and everything that was bringing in water, and the only other creek that comes in is Alkali creek, which comes in there at sec. 11, at county bridge, on county road, and that was bringing back .69 of a cubic foot of water. Then going on down stream we measured clear through to station G which is in sec. 5 near Laramie (1785) river. And I found that net result was loss of 1.24 sec. feet for entire basin from station A to G. To resume I started with 69.87 sec. feet in Sand Creek and that was increased to 71.2 feet by tributary, and going down stream I measured all of the increase from tributaries and I measured all withdrawals by diversion by ditches and at station G found that I had 1.24 sec. feet less than I had when I started at station A. The system of irrigation of these meadow lands in Wyoming along Sand Creek is that they turn all water into each ditch that it will carry, if there is that much in the stream, and permit it to run out over meadows indefinitely, and so far as I was able to observe that is all they do in way of irrigation. I took a photo of this method of irrigation, which was marked Defendant's Exhibit M-2. I operate a camera and make my own pictures. I have done this for 40 years, and my camera is a good one, and I took the picture marked Exhibit M-2. This picture shows method of meadow irrigation at that time east of headgate of Red ditch, which is down near Laramie river, and west [fol. 1086] of Hutton and Creighton (1786) lakes, and between measuring stations E and F. The ditch is indicated on map with a line marked 'Red Ditch'. On this photograph, Ex. M-2, the lighter portion indicates meadow, and in irrigating it, they got water over top of grass; in the distance there is a haystack on an island or little higher ground, and the water did not get up to it; I took that picture along the first (1787) week in June, 1933. It correctly represents the situation presented in that photograph, and it is a fair representation of the method of irrigation of meadows throughout that area, and shows the land covered with water.

Defendant offered in evidence Defendant's Ex. M-2 and same is included at this point as part of this abstract.

[fol. 1087] Defendant's Exhibit M-2 omitted. Printed side page 3131 post.

[fol. 1088] To make certain that certain deeds marked L-1 and S-1 submitted in evidence of Bruce G. Eaton were offered in evidence, they are now specifically offered in evidence.

It is also understood that next exhibit may be marked T-1, to take place of an omission in list of defendant's exhibits.

After having made the measurements of the amount of water in Sand Creek and the accretions to creek, and diversions from it, as above stated, later I returned and made measurements (1788) when the volume of water in Sand Creek was not so large.

[fol. 1089] My next measurements were on June 17 and 18, 1933, and I made them in same way as before, except that I did not utilize as many stations as first time; this time I only took measurements at stations A, C and F; the reason was I had become more familiar with the country and could do work more quickly. On June 17 I found 23.96 sec. feet in Sand Creek at station A, and I found the accretions from Running Water Creek was half a foot and Alkali Creek 3.72 sec. feet, which made the total amount with accretion 28.18 sec. feet. At that time the ditches were diverting water as follows:

Collins ditch No. 1 9.2 sec. ft.; No. 2, .45 sec. ft.; No. 4, .50 sec. ft.; Lindquist 4.5 sec. ft.; Knold 5.94 sec. ft.; Lone Tree 10.22 sec. ft.; Alice Hardman 5.83 sec. ft.; Spring Creek 3.72 sec. ft.; making a total of 39.91 sec. ft.; which were being diverted from Sand Creek; from Station A to Station C; and at station C, I found there was 25.05 sec. ft. left in creek. This (1789) demonstrated a very large percentage of water turned out on these meadow lands had returned to Sand Creek; in fact all of it had returned except 3.13 sec. ft. My observation was, and it was apparent, that the same water was used over and over as it came down the length of creek. This 39.91 sec. ft. had been diverted by eight different ditches.

The next point of measurement was from station C to F which is below Gullihan ditch No. 2 at Creighton Lake. I

started with 19.8 sec. ft. at station C, and I found that 10 ditches diverted an aggregate of 34.31 sec. ft. of water, as follows: John Hardman, 2.64; LeRoy, 8.16; unknown, .84; Garden, .63; Bush, 2.42; Richards, 4.29; Bradden, .99; Nedart, .96; Red, 1.77; Gullihan No. 2, 1.61; making a total of 34.31 sec. ft. diverted by said ditches. And (1790) at station F there remained in creek 2.19 sec. ft. In explanation I will say the waters of LeRoy ditch and Bush ditch do not return to Sand Creek in this section; they total 10.58 sec. ft.; that taken from 19.8 sec. ft. left 9.21 sec. ft. in creek; and the gain 10.92. The loss was 6.92 ft. and that added to 3.13 ft. the loss in section A to B, made a total loss [fol. 1090] of 10.5 sec. ft. The total amount of diversion was 64.22 sec. ft. The total amount of water in Sand Creek at beginning of this measurement was 28.18 sec. ft.; when the station C was measured, to pick up stations from C to F, it was found that instead of having 25.05 second feet as it had in afternoon of day before, it only had 19.8 on morning of June 18. That loss was undoubtedly the daily fluctuation in creek.

I started at station C with 19.80 sec. ft. on this measurement, and the 10 ditches diverted water aggregating 24.31 sec. ft., and I had left in creek, a residue of 2.19 sec. ft. This showed that there was a heavy return of waters to creek from the diversions made by each of these several ditches, and also the ability to reuse the return waters again by the ditches lower down. In my statement concerning the diversions of water (1791) from Sand Creek I have mentioned an unknown ditch and the headgate of this ditch is located near township line between townships 13 and 14 north, and between section 2 in township 13 and section 35 in township 14, on Sand Creek. I have marked the head of it about on township line. Down below the head about a quarter or half a mile is a ditch coming in from west into this ditch and it apparently has its head in Laramie River, and it crosses Sand Creek on concrete flume; there was no water in this ditch coming across there and from appearances it had not been used for a number of years.

This unknown ditch has a very good concrete dam across Sand Creek and is such that it can divert all the waters of Sand Creek at that point. I made a picture of that dam.

The same was marked Defendant's Exhibit N-2.

That exhibit shows dam at head of unknown ditch. I made extensive inquiries in the vicinity and nobody knew the name of the ditch. I inquired of Mr. (1792) Woodman, who for 10 years has been river commissioner on Sand Creek, and he did not know name of ditch. I inquired at state engineer's office at Cheyenne, and they informed me there was no such ditch, and if there was, they did not know about it; they said they had no record or permit for such ditch; and they had no map showing it; I measured diversion of water from Sand Creek by this unknown ditch [fol. 1091] and found it was 12.5 sec. ft.; this unknown ditch goes over into the Antelope Creek country and carries the water over the Divide into Antelope Creek; none of the water is used until it gets into Antelope Creek drainage; none of the water diverted by this ditch could return to Sand Creek for the use of ditches below on Sand Creek. The second time I was there I measured amount of water diverted at this dam by the unknown ditch and found .84 sec. feet being diverted. The photo N-2 shows the dam structure and water flowing in ditch. Incidentally in addition to irrigating lands over in Antelope Creek there was water being run from this ditch into a reservoir over there and (1793) being stored.

Defendant offered in evidence said photo, Ex. N-2, and same is filed in the transcript.

Defendant's Ex. E-2 shows Antelope creek; also the headgate and dam and line of this unknown ditch, and the point where it discharges into Antelope creek; there are other appropriations of water decreed out of the waters of Antelope creek, but not out of waters of Sand creek, according to the records in state engineer's office in Wyoming. Water was being diverted from Sand creek by this ditch and being run over there, and the ditches were using it there.

Thereupon a photo was marked Defendant's Exhibit O-2, which is a photo of unknown ditch; it was taken at a point where it takes water from Sand creek which exhibit was (1794) offered in evidence.

In my investigation of ditches on Sand creek I found that some of them had alleged headgates, some make-shift dams, but none had weirs; there was no means of measuring water

in these ditches, except that it could be made by meter measurement.

[fol. 1092] A photograph was marked Defendant's Ex. P-2.

This photograph represents the place where the Nedart ditch takes water from Sand creek and there is absolutely no structure in the nature of a headgate there nor any measuring device; the water from Sand creek just runs into the ditch; there is no means of shutting water out of the ditch unless you would blow dam out of Sand creek.

Defendant offered in evidence Defendant's Ex. P-2.

(1795) A photograph was then marked as Defendant's Exhibit Q-2.

It is a photo of Red ditch head and shows Sand creek too; I was unable to discover any headgate and there was no measuring weir or device.

Ex. Q-2 was offered in evidence.

[fol. 1093] A photograph was marked Defendant's Ex. R-2.

This exhibit shows the head of the Cook ditch; it has a part of a headgate, but no measuring device.

Said Ex. R-2 was offered in evidence.

Another photograph was marked Defendant's Ex. S-2.

Said exhibit shows headgate of Braden ditch out of Sand creek. It absolutely had no headgate, measuring device or other appliance.

Defendant offered in evidence said Exhibit S-2.

[fol. 1094] Defendant's Exihbit S-2 omitted. Printed side page 3137 post.

[fol. 1095] Defendant had a photo marked Defendant's Exhibit T-2.

This (1796) photograph shows head of Collins ditch, the first ditch that comes out of Sand creek, in Wyoming about a mile below state line. There was no headgate or measuring device on this ditch, but I found some sacks of sand

which they used to shut off water when they wanted to do so.

Defendant offered said Exhibit 2 in evidence.

I personally made the photographs that have been offered in evidence showing conditions of ditches along Sand creek. I took a photograph of the headgate of every ditch and whatever means it had in the creek for raising the water. This bunch of photographs marked as exhibits and introduced in evidence would be a fair representation of the head of all the ditches taken out of Sand Creek in Wyoming. From my inspection these ditches had no appliances to regulate water, either to let it in, or to shut it out of the ditch, except the rise and fall of the creek itself, and except they can take some loose rock or manure off dam or put it back on to regulate; there was nothing anywhere to control (1797) the waters in the ditches.

I made inquiry of the water commissioner and of the state engineer of Wyoming as to what, if any, record they had as to the amount of waters that these ditches from Sand creek in Wyoming had been diverting in years past. I went out to the home of Mr. George Woodman, whom I was told had been water commissioner for 10 years, and made inquiry of him, as to whether he had any way of telling amount of water that had been diverted by these ditches from Sand creek, and he told me he had absolutely no way, that there was no record of diversions of water from Sand creek; I then went down to the state engineer's office, and they hunted for 2 hours for any records, and they informed me that there was no record of any diversion of water from Sand creek in Wyoming. I measured all these ditches myself on each of my trips, all the water being diverted by each ditch, and on the first trip the amount of water diverted by these ditches, was far in excess of the amount of their priority. On the second trip some of the [fol. 1096] ditches were drawing more than their priority, and I believe that Davis Brothers No. 1 ditch was not drawany (1798) water at all.

In my investigations of Sand creek I found a ditch coming from the Laramie river, serving part of these lands having decrees from Sand creek. I found that the indications were that no water had been running in that ditch for a long time. But the ditch that came from Laramie

river or Sand creek which I have named the unknown ditch was taking water from Sand creek. In addition to that there was a ditch called the Haley and Hoge ditch, that comes into that territory from the north, from Laramie river, and that ditch was running 26 sec. ft. of water into this territory. On both of my trips the amount running in that ditch was the same. There was another ditch that comes into this territory called the Laramie ditch, and I was unable to tell anything about that ditch because so much water was being used by the Haley and Hoge ditch that the Laramie ditch, except in a few places, was completely under water; I have shown the Haley and Hoge ditch on map by line and legends; that shows line of ditch correctly and lands it serves; the period of my investigations extended from the 20th of May until 19th June, 1933, and in all I made three trips up (1799) there.

In regard to the snow fall along Sand creek, and the Sand creek ditch system; the first time I was up there, up near Chimney Rock, in Wyoming, there was a little snow there; on the same trip I found over in Colorado, and the dam of the Divide ditch, I found snow so bad that I could not get to the head of the Divide ditch, and I determined that there was no water running in Sand creek there nor in Divide ditch, at that time; the Divide headgate is 6 or 7 miles south of Colorado state line; at that time I was unable to get over to Sand creek or Deadman or any of the other creeks above, because the snow was so deep I could not get there; the snow there was generally about 5 feet deep on the level. The water that I mentioned that I found on my first trip was produced wholly by the Sand creek area north of state line and north of where the head-[fol. 1097] gate of Sand creek ditch is located. (1800) On my last trip, on June 18, 1933, I ascertained that the snow had gone below an elevation of 9800 feet. I have a barometer by which I took the elevation; the elevation of the snow line I found then was at a point close to where the Deadman ditch enters Sand creek; from Deadman creek down to Diversion Dam in Sand creek, the snow had all melted; above Deadman creek, and where the Deadman ditch gets its water, snow in that area was very heavy. It was so heavy that it was impossible to get through on horseback; we got through to a point on the north side of Deadman hill, but it was very difficult, and the snow cer-

tainly averaged 4 feet deep over that entire area, and in many places it was from 10 to 20 feet deep. From my observation in going over Sand creek and the Sand creek ditch system, and the Deadman ditch and observing the water that was being collected by each, I would say, that beginning on the 20th of June, 1933, it would, in my opinion, be that the waters of the Divide ditch at the headgate (1801) on Sand creek would be two-thirds Deadman water and one-third Sand creek water. Now that proportion may be too low. It would perhaps be three-quarters Deadman water and one-quarter Sand creek water.

Q. In the evidence submitted by the complainant in this case, two engineers, I think Mr. Meeker and Mr. Drummond, measured the weir where the Deadman ditch discharges into Sand creek about July 11, 1929, and found 3½ and a fraction feet of water, and a day or two afterwards they measured the amount of water at Divide flume and found over 8 feet of water, and expressed their opinion that only 40% of water of this system could be obtained from Deadman and 60% would come from Sand Creek. State whether the measurements made at that time, and in that stage of water would be any indication whatever of the entire yield of water during an irrigation season.

A. No, sir; at that time the snow must have been all gone. It must have been only seepage water that was coming into either of the streams.

[fol. 1098] And that would not be a measure of what one would expect when the snow was melting. The run-off from rapid melting snows is a very large proportion of the water for this system. A very large portion of the water would be from melting snows. After the snow had melted there would be very little water in either Deadman ditch or Sand creek itself, and what water (1802) there would be, would be water coming from springs and underground sources.

During the last week that I was up there, there was a rapid diminution in the supply of water from melting snow in that area. The average flow of the Divide ditch diminished very rapidly during that time. The exact extent I could not state very clearly but from about 150 second feet maximum down to 100 feet; that may be subject to correction when we get what the automatic registering sheet shows it was. It showed a very substantial decline in the

amount of water in the stream as the snow had melted off that portion of Sand creek in Colorado. In making up my estimates as to the relative amount of water that could be procured from Deadman ditch, as distinguished from Sand creek water, I took into consideration relative areas of snow fall tributary to the two streams: the area that would be above 9,800 feet elevation would be less than 2 square miles tributary to Sand creek, and a little more than 3 square miles tributary to Deadman ditch. I have not been familiar with that special locality but this one spring, but I believe that the configuration of the mountains is such that there is ordinarily a heavy snow drifting (1803) covering the watershed of Deadman creek. As to the relative time of the rapid melting of snow I would say that the Sand creek drainage has most of its area exposed to a western sun, and the Deadman drainage is more in a circulsr form, so that much of it would not be exposed to the western sun: a good deal of it would be on the north side of some high mountains there, and some of it on the south side of other mountains, but not much would be exposed to the western sun.

In view of topography of country and exposure of sun [fol. 1099] as the summer comes on, the first run-off from melting snow, would be from Sand creek, because the elevation at the head of the Divide ditch is only about 9,000 feet, and the snow at 9,000 feet melts much earlier than it does at 10,000 feet. In the latter part of the irrigation season more water comes from the Deadman system than from Sand creek itself; that would be true up until snow has gone off the Deadman drainage, a short while after it has gone, and the proportion would be much different than it is when the snow is melting. In other words it will be much greater on the Deadman drainage say between June (1804) 20 and July 1, than it will be after that time, because the snow will be gone. I think that undoubtedly the snow-fall in that locality varies greatly from year to year, and the run-off depends almost entirely on the snow available for furnishing the water. I am not sufficiently familiar with the situation there to answer how it is every year. I am familiar with similar mountain valleys and ditches and how they operate with reference to snow-fall. In my opinion when the snow-fall is light there will be a light run of water, and

when it is heavy there will be a heavy run of water. It depends largely on the snow-fall.

This year the snow-fall on Deadman drainage was extremely heavy compared with other areas at same elevation, and I am forced to conclude that usually the snow fall in the Deadman area would be heavier than at the same elevations in other localities.

I have been up along the Deadman ditch in sec. 15 at a point (1805) where a cut has been made through a spur or hill, and there is evidence of the complainant and an Exhibit No. 11 introduced, to the effect that it indicated that a ditch had sometime been constructed around the point of the hill. I have read that evidence, and will state that I have examined that so-called old ditch with a great deal of care; I do not believe that any engineer or anybody else would conclude that that was a completed ditch, or a very much started ditch. The entire ditch was 500 feet long, and one plowing had been taken out of it and put on the banks; the total distance around that point was approximately [fol. 1100] 4,000 feet, and no other work, except some clearing had been done, and I could not conclude that any engineer, whoever looked at it, would say that was a completed ditch, that went out there 500 feet, and did not go anywhere's else. I noticed the cut that was made to join the survey after it had gone around that spur. I would say that making that cut across was a proper construction; anybody that would have constructed the ditch around the hill, when it — only 400 feet through the hill, would have been crazy.

(1806) Cross-examination.

By Mr. Greenwood:

My first visit to the Sand creek area for the purpose of investigating was on May 20, 1933; I have been across it many other times. I could not say whether the conditions I have mentioned and shown by the photograph portrayed the conditions prior to 1933; I never visited the head waters of Deadman creek, prior to June 17, 1933, for the purpose of inspecting the same; I have been on the headwaters of Deadman creek a good many times; but I have only been on the watershed this time to investigate the conditions of

the Deadman ditch; from my investigation there, in June, I am of opinion that the snow-fall on the headwaters of Deadman creek is annually heavier than on some of the other creeks at the same elevation because the configuration (1807) of the country there is semi-circular and my experience is that those areas usually collect more snow than where the country is straight. I would say that the extreme elevation of the headwaters of Deadman creek is 500 feet higher than the headwaters of Sand creek; I base my statement on the fact that I have examined both of them and took the elevations of both of them, when I was up there; I found the elevation at the extreme headwaters of Sand creek was about 9,900 feet; and of Deadman creek 10,400 feet; I have a memoranda of that data but do not have it with (1808) me. While I was there I took a picture of each ditch taking water from Sand creek in Wyoming; I do not think I have all of them here with me; I have a lot of them. I will have to hunt through my notes in order to see if I have a photograph of James Hardman No. 1 and 2, and the Davis Brothers No. 1 and 2. I do not seem [fol. 1101] to have that one here; I have it at home; the headgates of the James Hardman ditches Nos. 1 and 2, are all the same headgate; this headgate is shown as located in NW¼ of sec. 11-14-75, on Defendant's Ex. E-2; the headgate of the Leroy (1809) ditch is in NE¼ of sec. 2-13-75; and headgate of Davis Bros. No. 1 is in SW¼ of sec. 13-13-75 and of the Davis No. 2 in SW¼ of sec. 24-13-75; it is same as Alice Hardman; when I was up there in June, 1933; the LeRoy ditch was diverting water from Sand creek; something over 13 ft. The Davis Bros. Ditch No. 1 was also di- (1810) verting water from Sand creek then, 9.77 cu. ft.; at the same time Davis Bros. No. 2, also called Alice Hardman ditch, was diverting 11.27 cu. ft. The James Hardman Nos. 1 and 2 ditches were diverting 9.27 cu. ft.; the waters that Deadman ditch contributes to Sand creek for diversion through the Divide ditch, come principally from melting snows, I presume they have rainstorms there (1811)in the summer time; I think the snow-fall would produce 90 or 95% of water at that elevation; I would say that the contribution to Sand creek from Deadman creek and Deadman ditch would be on account of snow, and seepage and spring waters, and of course there would be some rain; the relative contribution of the two streams to

the Divide ditch would materially change after the snow had melted it would be my opinion that more would come from Deadman than from Sand creek, because the snow goes off later (1812) and at that elevation I would say that the Deadman area will always have more snow-fall than Sand creek area, but if you come on down Sand creek area, it covers a lot of lower territory, and there is a heavier run-off earlier in the season there that the Deadman does not have at all. From my observation I would judge that the Deadman would contribute water to Sand creek from the first to tenth of June; prior to that time water diverted by the Divide ditch would be Sand creek water; it might be as late as June 10 in some years. When I made my measurements of water being diverted through Divide flume on June 5, 1933, there were some deposits of sand and gravel on floor of flume; (1813) this is shown on drawing of this flume Defendant's Ex. G-2, and I would describe it as follows:

[fol. 1102] Starting over what I call northwest corner, which is on the side where the gauge station is, there was sand there; I could only give its depth approximately, it was about .4 of foot deep; and extends out about half way across flume where it runs out. And then the sand over area to east down to end of flume extends about ⅔ of the way across east or down stream end of flume, and it is heavier at upper end, and lightest at lower end. In explanation of that sand I would say that when I went there I cleared that flume completely of sand; I had water turned out so I could do it; and when water came back in that sand was again deposited there within a half an hour after the water come back; so that that sand is a permanent condition at that weir, my purpose was to make a measurement free of sand but the sand came back in a short time; I tried it a number of times after that and (1814) the sand was the same; I tried it with various depths of water and it did not seem to change with the quantity of water; when I made my measurement there was approximately 150 ft. water in flume. I then proceeded to lower the water; and I lowered it down until there was just enough water to run over the sand, and it did not apparently change the sand, and I reached a conclusion that that sand is a permanent matter so far as that flume is concerned; that is regardless of the quantity of water that sand on there is a permanent

fixture; I observed the register there but I could not see the gauge staff; it was inclosed in the house and I used gauge staff that is in flume; not one that was in the (1815) still—well in the house; I could not see it;

My current meter measurements shown on Defendant's Ex. H-2 were all made the same day; they were all made between 8 o'clock in the morning, until 2 or 3 in the afternoon; on June 5, 1933. The location of the headgate of the Divide ditch on Sand Creek is a good many miles upstream from the headgates of the Hardman Nos. 1 and 2, Davis Bros. Nos. 1 and 2, and the LeRoy ditch. As located it would prevent water from reaching those other headgates [fol. 1103] below. It is so located that it can (1816) get the water that comes in above the ditches just named.

Defendant's F-2, a map, shows Columbine ditch, and also what is called Columbine Extension. In my testimony concerning Deadman ditch and the streams which it intercepts I did not include that ditch, designated as Columbine ditch; I do not know as a matter of fact that the ditch designated as Columbine ditch is the property of the Mountains and Plains Irrigation Company.

Redirect examination.

By Mr. Todd:

I have a compilation made of the Exhibit No. 85 of complainant, which is a certified copy of decrees on Sand creek in Wyoming, showing in tabulated form the acreage under those decrees, and the total amount of land irrigated under those decrees; I made this tabulation from said exhibits; the total acreage named in the decrees is 4811 acres. I found that of this amount 2980 acres was ir- (1817) rigated. The total amount of the appropriations made by these ditches is given as 70.8 cub. feet per sec. of time; that includes James Hardman Ditch No. 1, 1.81 ft. LeRoy ditch for 8.64 ft., and Davis Bros., Alice Hardman Ditch, 4.57 ft., and Davis Bros. Sand Creek No. 2 ditch, 1.78 ft., and total makes 16.80 sec. ft. The remaining appropriations on Sand creek, aggregate 54 sec. ft. I have heretofore testified concerning my experiment made on Sand creek in Wyoming beginning within a mile of the Wyoming line and running north, and I found that 25 sec. ft. of water was sufficient to supply all of those appropriations,

and have a residuum left. The LeRoy ditch, James Hardman No. 2, Davis Bros. No. 2, and Alice Hardman, and Davis Bros. Sand Creek No. 2, do not have any headgate or anything of that character to regulate (1818) the water to keep out of the old channels or to turn it in.

As the creek rises the effect would be that more water would run into those ditches; they might drive some stakes in those ditches and put some manure on them to stop it; but I did not find anything of that kind on those four ditches; on Davis Bros. No. 1, they were trying to shut some of it out; if this 16.82 feet, the priorities of these four ditches, were diverted at the Sand creek dam, they would not have to be supplied to the ditches below; if the waters [fol. 1104] were turned out of those ditches it would make it unnecessary to turn down this 16.82 sec. ft. of water; incidentally Mr. Woodman the water commissioner informed me that in all of the ten years that he was on Sand creek this water was diverted at Divide Ditch headgate.

Recross examination.

By Mr. James A. Greenwood:

(1819) I asked Mr. Woodman if the water officials of Wyoming ever requested water to be turned past Divide headgate to satisfy appropriations in Wyoming, and he said in reply that they did sometimes; as many as four times a year he went up there and asked the Eaton interests to turn down some water, and I asked him if they turned it down, and he said they promised to do it, but he did not know whether they did or not. Mr. Eaton never said anything to me as to whether he did or not, and I do not know. In making my tabulation concerning the acreage irrigated in Wyoming from Sand creek, according to decrees introduced by complainant, some of which were on tributaries of Sand creek, and some on Sand creek proper, I only included in my tabulation the decrees on Sand creek proper and did not include the decrees on the tributaries.

[fol. 1105] (1820) WILLIAM J. MCANELLY, witness in behalf of defendant, recalled:

Direct examination.

By Mr. Wm. A. Bryans:

I am familiar with those ditches known as the Bob Creek Ditch and the Columbine Ditch and both take water from tributaries of the Laramie River. I believe I first saw the Bob Creek Ditch on July 18th, 1918, when I went there to make some surveys and to determine what repairs were necessary in (1821) order to put the ditch in condition to carry water. At the date of my first visit, I found the ditch in good condition with the exception of three or four places where the banks had washed out and where the timber work through the cut at the Divide was in bad condition and had to be replaced. The ditch showed every evidence of water having been carried through it prior to the time of my visit. The timber work at the flume in the upper end of the ditch also showed that water had been run through the ditch, although no recent work had been done. I also found that the ditch would carry water so far as its grade was concerned.

(1822) Cross examination.

By Mr. James A. Greenwood:

I cannot say when the Bob Creek Ditch first carried water, but it was in condition to operate as a carrier when I ran the grade line in 1918. I do not mean to say that it had carried water prior to that time, but it was in condition that it might have done so. I was not Water Commissioner at that time, and do not know of any record of water having been run prior to that year. The first record I know about is 1921, which is the first season after I became Water Commissioner.

Redirect examination.

(1823) By Mr. Wm. A. Bryans:

In 1918 I was employed by The Water Supply and Storage Company and was not Water Commissioner.

[fol. 1106] Recross-examination.

By Mr. James A. Greenwood:

In 1918 I was superintendent of The Water Supply and Storage Company and in that year I ran the levels on the Bob Creek Ditch and at that time I found the grade was proper in order to run water through the ditch into the Cache la Poudre watershed. The ditch was repaired the next following spring after I was there, and the timber work has all been replaced since that time. The grade of the ditch has not been lowered to my knowledge since 1918.

Redirect examination.

(1824) By Mr. Wm. A. Bryans:

I am familiar with the mountain reservoirs of the Mountain and Plains Irrigation Company and look after the storage of water in all those reservoirs. The water is handled through our system of exchange and has been held in North Poudre reservoirs 5 and 6, Barnes Meadow, Peterson Lake, Big Beaver Reservoir and Twin Lakes. The water from the Laramie watershed has been taken directly into the Poudre in various ditches and credit taken in the several reservoirs for use later in the season. I consider this the most economical way in which to use water and that it is to the best interest of the Poudre Valley as a whole. Should the Court in this case decree that no further diversions should be made by means of the Bob Creek and Columbine Ditches, it would render the reservoir properties of the Mountain and Plains Irrigation Company almost valueless for there would be no water available for storage.

(1825) Recross examination.

By Mr. James A. Greenwood:

In the present year, 1933, there has been no storage of water or run of water from Bob Creek or Columbine Ditches.

[fol. 1107] THEODORE B. MOODY, witness in behalf of defendant.

Direct examination.

By Mr. C. D. Todd:

I have resided in Greeley for 25 years. My occupation is that of surveyor and civil engineer. Most of my work has been county surveyor work, measuring lands, establishing corners of lands, and water and irrigation ditch work; I have been associated (1826) with Mr. Lewis L. Stimson in his work for the past 12 years; I was with him when he made his trips up on the Sand creek territory, during June, 1933; I assisted in making measurements of lands in Wyoming on Sand creek; my part of that work was that I was the instrument man, taking notes and measurements, and I worked up the notes afterwards, and placed results on map; I made two maps, Defendant's Ex. E-2 and F-2; they correctly represent streams, ditches and lands along Sand creek; Lewis Stimson, Jr., son of Lewis L. Stimson, also assisted in the work; in getting the material, we all worked together, but in making the (1827) maps, I made these two maps; I made both of them.

LEWIS M. STIMSON, JR., witness in behalf of defendant:

Direct examination.

By Mr. C. D. Todd:

I have resided in Greeley, Colorado, for 22 years; I am son of L. L. Stimson, who has previously testified; I am a civil irrigation engineer, and a graduate of the Colorado Agricultural College; I have assisted my father for several years, and have had practical experience in matter of water and land surveying and measurement; I was along with my father on these trips that were made up Sand creek valley in June 1933; I assisted in the measurement in the rating flume and kept the time and took notes; my father ran the instrument; in measuring various ditches that he has testified concering on Sand creek I took time and took notes; later I computed amount of water and other measurements

and gave this information to be put on maps; the graph of flume in Sand creek ditch was made by Mr. Moody from my notes.

Thereupon a paper was marked Defendant's Exhibit U-2.

[fol. 1108] (1828) Direct Examination.

(1829) By Mr. William R. Kelly:

I measured the dimensions of the Ventura flume at the outlet or east portal of what is known as the Laramie-Poudre tunnel or the Greeley-Poudre tunnel; I measured what is called the Parshall flume there, and got it height and width, and its relationship to the tunnel outlet itself. I drew a map of it, and it is marked as Defendant's Ex. U-2; I prepared the drawing so marked. This drawing, Ex. U-2, shows stilling basin, and the retaining walls, at Laramie-Poudre tunnel, and the Parshall-Ventura flume at mouth of stilling basin, it also shows the east portal of the tunnel, and its shows the present position of the automatic register. It is located on the east side of the flume looking down stream; it shows the location of the staff gauge.
(1830) It also shows the throat of the Ventura flume; as you look down the stream the mountain is on the left side; on the right side is the dump or deposit of the material which was taken out of the tunnel in its construction and is marked 'tunnel dump'. I have depicted on this exhibit the correct length and height of the structure which consists of the stilling basin and the concrete flume in which is located the Parshall-Ventura weir; I have indicated the correct dimensions of the weir itself.

Defendant offered in evidence Defendant's Ex. U-2 and asked leave to substitute blue print copies thereof for all parties.

I obtained data upon which this exhibit is based on June 13, 1933. At that time I did not find any rock, sand or gravel in the throat of the Parshall or Ventura measuring weir; there was however sand and gravel in the portion of the flume leading into the throat. Sand and gravel came within one foot of the gauge staff.

(1831) Thereupon a paper drawing was marked Defendant's Exhibit V-2.

This exhibit is a drawing which depicts the Sky Line flume on the Laramie river; it is drawn to scale, and is based upon actual measurements, as to dimensions, width and length, as made by me. Mr. Moody made that drawing. I have examined same and it is correct from notes and measurement that I took.

Defendant offered in evidence said drawing, Exhibit V-2 [fols. 1109-1111] and asked leave to substitute a blue print copy thereof.

Cross examination.

By Mr. James A. Greenwood:

I got the data from which we prepared that sketch on June 14, 1933. At the time that I gathered the data for ex. U-2 the drawing at tunnel, the water was shut out of west portal of tunnel, (1832) and there was approximately .3 foot on gage staff; the water was shut out so that we could see the condition of the gravel in the flume; the throat of the flume was clear and free from gravel. Exhibit U-2 and V-2 here follow.

Exhibit U-2 omitted. Printed side page 3140 post.

Exhibit V-2 omitted. Printed side page 3141 post.

[fol. 1112] M. C. HINDERLIDER, witness in behalf of defendant, recalled:

By Mr. Shrader P. Howell:

(1833) Since I last testified, I have made further computations with respect to my testimony given on page 696 of the transcript, and found certain mathematical errors which I now direct correct. These figures that I now give are the correct figures and should be substituted instead of and for the figures given in lines 9, 11, 12, 21 and 24 on page 696. (The corrected figures have been inserted at folio 696 and appear in the corrected form in this transcript.)

(1834) From my experience as an administrative officer of the State of Colorado, and my observations, it is my opinion that the Parshall flume is a practical method for

the measurement of flowing water and a satisfactory device with which to measure streamflow. This type of flume requires a nominal drop in the head of water through the flume, more than the rectangular flume ordinarily requires. Many hundreds of Parshall flumes have been installed and are being used for measuring water diverted from the public streams of this State, and (1835) practically in every instance they have given satisfaction as proper means for the substantial and accurate measurement of flowing water. Where the slope of the canal or ditch will permit the use of this particular type of flume I recommend its installation in all such instances. Where the gradient or fall in the ditch is very light, we would ordinarily use what is known as the rectangular type of flume. On the transmountain diversions in this state, the automatic registers used for recording diversions out of the Laramie Basin into the Poudre River Basin consist of two types—one [fol. 1113] known as the Bristol automatic register, and one, known as the Stevens type.

(1836) The Bristol type is in use to record the diversions by the Laramie Poudre Tunnel, the Skyline and the Sand Creek, or Divide Ditches, while the Stevens type is used for recording the diversions made by the Columbine and Bob Creek Ditches. These two types of registering devices are generally recognized by Engineers as efficient and standard equipment. They are generally used throughout the West by the United States Bureau of Reclamation, and I believe by the United States Indian Service in some instances, and also by the United States Department of Agriculture and by State agencies in the semi-arid regions.

The term "discharge measurement" as used by engineers and hydrographers, refers to a determination by mechanical and mathematical processes of the quantity of water passing through a measuring flume or a section of a ditch, canal or river.

(1837) To make certain determinations of the flow of water in the stream, two things must be ascertained, these being the cross-section area of the moving water, and the average velocity of the same. The cross-section area is determined by careful soundings made at frequent intervals across the stream or rating flume at right angles to the flow of the water. The velocities are determined by means

of an electric current meter held at certain depths below the surface of the moving water, at points corresponding to the points at which the soundings are made. The summation of the products of the average depth at adjacent points and the distances between such soundings, and the average velocity between such points, gives the discharge of the stream or ditch in question, in cubic feet per second of time.

The so-called electric current meter is a mechanical [fol. 1114] device usually consisting of a series of cups forming the outer periphery of a horizontal wheel which rotates upon a sharp vertical pivot in such manner as to practically eliminate friction. The top of the vertical axis of the wheel consists of an eccentric which makes and breaks an electric contact at each revolution of the meter wheel. This process creates a sharp sound, which is magnified and transmitted to a small ear phone worn by the person using the meter. The rotation of the wheel of the meter is not actuated by an electric current, but by the current of the moving water. While such an apparatus is usually called an electric current meter, the only part performed by electric energy is the transmission by sound of the revolutions of the rotating wheel of cups through means of electric wires to (1838) the amplifier worn by the operator. The necessary electric current is supplied by means of a small dry cell battery. Such a mechanism is compactly and very neatly shaped, and provides a very practical and efficient means for ascertaining the velocity of moving water. Prior to its use in measuring the velocity of flowing water, the current meter is carefully rated or calibrated. The data obtained in the process of calibrating the instrument is used in preparing a rating table for the meter which shows the number of revolutions of the meter wheel per second of time for various ranges of velocity. In measuring the velocity of flowing water, the meter is ordinarily held stationary by the operator and the number of revolutions of the meter wheel is noted. The lapse of time covered by a number of revolutions of the meter wheel is noted in seconds and fractions of seconds by means of a stop watch. By [fol. 1115] reference to the aforementioned rating table for the meter in question, the velocity of the water is determined.

In the State Engineer's office of Colorado we use the Price-Gurley current meter, commonly referred to as the Price (1839) Electric meter, and this is the same type of current meter that is used by the Water Resources Branch of the United States Geological Survey.

The practical limits of accuracy by which water measurements are determined by an electric current meter are from a fraction of one percent to about five percent, under favorable conditions, and within somewhat greater limits, under more unfavorable conditions. Under most favorable conditions, determinations of discharge within from a fraction of one per cent to five per cent. of absolute accuracy may be made. Determinations within 7% of absolutely accuracy are recognized as fair and generally accepted.

The State Engineer's office of Colorado has the current meters which we use in making measurements rated or calibrated (1840) at the United States Government Hydraulic Laboratory at the State Agricultural College, Fort Collins, and we usually have that done in the Spring before the opening of the field season and again immediately following the close of the field work in the fall of the year in order that any errors resulting in measurements due to damaging of the current meters during the field season, may be detected and properly taken account of.

In rating or calibrating a ditch or canal the quantity of water flowing in the canal or ditch is determined for different depths of discharges over a range of depths ordinarily sufficient to cover the maximum carrying capacity of [fol. 1116] such ditch or canal. The determination of discharge at any particular depth of flowage should be made while there are no fluctuations occurring in the quantity of water carried by the ditch or canal. The results of such determinations are then plotted on sheets of paper which are ruled both vertically and horizontally. The horizontal rulings correspond to the gage readings or depth of the water in the measuring flume, while the vertical rulings correspond to the quantity of water flowing through the measuring flume. Through the points so plotted a uniform curve is drawn to cover the complete range of depth of flowage of water through the rating flume.

(1841) These rating tables are furnished to the Water Commissioners by the State Engineer's office and from the

same they may determine from any gage reading taken from the gage staff or from the automatic register chart, the quantity of water passing through the flume at any moment, or the average quantity for any 24-hour period. From such determination the Water Commissioner then computes the quantity of water in acre feet carried or diverted by any such ditch during any such period. One cubic foot of water per second of time flowing for 24 hours being equivalent to 1.98 acre feet, or substantially: 2 acre feet in common practice the unit of two acre feet is used to simplify computations.

Under the practice which obtains in Colorado, the Water Commissioner determines in the first instance, the quantity of water in second feet, and it is my understanding that a similar practice prevails in the State of Wyoming.

I have personally inspected the devices used for the measurement of water diverted from the Laramie River through the Laramie-Poudre Tunnel. In May, 1927, a six foot Parshal flume was installed in the lower end of the [fol. 1117] original concrete structure, and I inspected this installation (1842) on May 24, 1927.

The flume at the Poudre Tunnel is located in the lower end of the rectangular concrete structure, extending from the outlet of the Laramie-Poudre Tunnel for a distance of substantially 120 feet along the mountain side. There is a right angle turn in this structure a short distance below the outlet of the Tunnel. It is a fact that water issuing from the Tunnel is diverted from its course as it issues from the Tunnel by the right angle turn in the rectangular structure, and before it passes on its way to the Parshal flume. I consider that this flume is located in the only practical place where it might be located, because of the topographical and geological conditions which prevail at the outlet of the tunnel.

This rectangular structure rests upon lossely compacted material which was excavated from the tunnel during its construction. This debris extends for many hundreds of feet down the precipitous slope of the mountain below the outlet of the tunnel.

If the Venturi flume were installed directly at the outlet (1843) of the tunnel so that the water issuing would pass directly through the flume without any change in the direction of the current, a very expensive structure extending

down the mountain would be required to take care of the discharging water because of the loose formation of the Tunnel debris, upon which such structure would have to be located. It appears that the present location of the Venturi flume, is the only one that might be selected at the East Portal of the Tunnel without incurring great and unnecessary cost.

This flume was designed and installed under supervision of Ralph L. Parshall, Senior Irrigation Engineer of the [fol. 1118] United States Department of Agriculture, in May 1927. At the time I made an inspection in May 1927, I made some measurements of the discharge of water passing through the flume and at a gage reading of 1.08 feet, I found a discharge of 20.98 cubic feet per second of time. I made a further measurement of the discharge on May 24, 1927, and checked my first measurement within .47 of one cubic foot per second (1844) of time, or within about 2.2%. On the following morning May 25, 1927, I made another discharge measurement in this flume and found 8.33 cubic feet per second of time at a gage height of 0.66 feet. At the time of making these measurements there appeared to be some discrepancy in the results of the measurements, and the theoretical rating table for the Parshall flume. I was unable to harmonize such discrepancies with the theoretical rating table for this size of flume and reported the matter to Mr. Parshall, who shortly thereafter visited the flume at my request, and discovered that the gage rod in the flume had been erroneously set 0.16 of one foot too low. But when the gage rod was raised so that the zero on the rod corresponded to the crest of the throat of the Venturi flume, which is the point that controls the discharge of water through the same, the measurements which I had made on May 24th and 25th fell almost exactly upon the theoretical rating curve for a Venturi or Parshall flume of this size. I think I called Mr. Parshall's attention to the apparent variance in my measurements immediately and he visited the flume and made the correction on or about June 10, 1927, which is approximately one month after the flume was installed.

(1845) After I made my measurements and the apparent error resulting therefrom was corrected as I recall I made [fol. 1119] a temporary rating table and furnished the same

to Water Commissioner McAnelly of that district, who was in charge of the administration of water in District No. 3.

Two of the measurements which I made at the Parshall flume at the tunnel outlet in May, 1927, are included in complainant's Exhibit No. 59, one of which shows 20.98 cubic feet per second of time and the other 8.33 cubic feet per
(1846) second of time. I have caused to be tabulated and plotted all the measurements shown by Complainant's Exhibit No. 59 and found that they produced a rating curve conforming closely to the theoretical curve, showing the capacity of the Venturi flume of the size installed at the Tunnel.

Defendant's Exhibit E-1 consists of a tabulation of all the current meter or discharge measurements made in this Venturi flume from the time it was installed up to and including the year 1932. This tabulation consists of four columns, the first of which furnishes the number of current meter measurements corresponding to the same number on the rating curve to the left of the tabulation. The second column shows the date on which each measurement was made and the third column, the gage height for the measurement and the fourth column the discharge in cubic feet per second of time; the fifth column, the name of the hydrographers who made the measurements. The curve on this Exhibit shows a theoretical rating curve for the capacity of a six foot Venturi flume, with depths of water varying from
(1847) zero to four feet.

The measurement of water is not an exact science. Two equally experienced and capable engineers or hydrographers may obtain somewhat different results in making independent measurements of flowing water at the same time and place by using the same methods.

[fol. 1120] Exhibit T-1 omitted. Printed side page 3088 post.

[fol. 1121] We have found from experience that it is necessary when measuring water flowing through a Parshall flume by means of the current meter, to select the proper point in the flume, which should be fairly close to the contracted section, or what is called the throat of the flume, since this is the point in the flume which controls the discharge of water through the flume. Current meter measurements made at points too far upstream from the throat

section will give varying results, particularly if there should be some debris in the upper end of the flume, or other obstructions causing irregularities of channel conditions.

The measurements which do not coincide with the curve on Defendant's Exhibit E-1 appear to be far upstream from the throat section of the flume, where some deposits of sand, gravel and cobblestones affected the accuracy of such current meter measurements.

(1848) I have had C. E. McGraw, one of the hydrographers of the State Engineer's office, to make further discharge measurements of the Parshall flume since 1932 and have caused his measurements to be plotted on the curve in connection with measurements theretofore made since the flume was installed in 1927.

(Defendant's Exhibit T-1 marked for identification.)

This exhibit is a theoretical rating curve for a six-foot Venturi flume of the size used to measure the water carried through the Laramie-Poudre Tunnel, upon which were plotted the measurements of discharge made by means of the current meters by various engineers and hydrographers during the period covered from the time the flume was in-[fol. 1122] stalled in 1927, up to and including June 10, 1933.

(1849) The measurement made by Mr. McGraw in 1932 falls slightly to the left, or above the theoretical curve. As nearly as we can read such difference from Defendant's Exhibit T-1, the variation is substantially 2½ or 2¾ cubic feet per second of time.

From my experience and study of the results of the discharge measurements made by means of current meters of the present Venturi flume installed at the outlet of the Laramie-Poudre Tunnel, I should say that regardless of the quantity of debris that from time to time accumulates above and within the upper section of this rating flume, and regardless of the right angle bend in the concrete structure which I have heretofore mentioned and which tends to cause cross currents and the deposition of more or less debris in the upper reaches of the Venturi flume at times, such conditions do not materially affect the accuracy of the discharge of the water through the throat section of the flume as determined by the theoretical rating curve.

(1850) I have made a personal inspection of the measuring devices and flume installed on the Skyline Ditch. The

measuring flume on this ditch is located on the top of a low divide between the watershed and the headwaters of the Big Laramie and the Cache la Poudre Rivers, about one-fourth of a mile above what is known as Chambers Lake, which constitutes the head of the Poudre River. This measuring flume is a substantially built timber structure of a length of about 16 feet, an inside width of 12 feet, and a depth of about 3½ feet. It is well located with respect to [fol. 1123] both the alignment and gradient of the ditch, so as to provide a regular and uniform flow of water, all of which conditions are conducive to proper determination of the amount of water diverted by this ditch. There is installed in the ditch a Bristol type of automatic register, which is standard equipment. While I cannot testify from personal knowledge as to the characteristics of the flume and register device installed on Sand Creek or Divide ditch, I can properly state from the records in my office that there is a flume on the Divide or Sand Creek Ditch, rectangular in character, and it is equipped with a Bristol automatic recorder.

(1851) I have had occasion to inspect the automatic register charts on file in the State Engineer's office in Colorado, taken from the automatic register devices at the outlet of the Greeley-Poudre Tunnel, the Skyline and the Sand Creek or Divide ditches.

There are some discrepancies in these automatic charts but discrepancies covering a series of years will creep into records of this kind, wherever they may be obtained, and under anyone's supervision. I consider the errors or discrepancies which appear on these series of charts are of a minor nature, and tend to compensate one another, and therfore equalize the effect of such discrepancies. Taken by and large, such records would give a correct record of the discharge made by these various ditches with a reasonable and proper degree of accuracy in view of the field conditions which prevail at the points where such records were taken.

(1852) In my opinion the failure of a person who changes the automatic charts to insert thereon the gauge staff reading at the time it is placed on or moved from the register, [fol. 1124] does not destroy the value of such record; that is true because the party who changes the chart and sets the pen to the correct gage reading, must obtain the informa-

tion needed for so doing by referring to the gage rod in the flume and since the pen chart is always immediately before his face during this setting of the pen, the presumption must be that he would set the pen to correspond with the gage rod reading, and if any errors occur, such error would more likely result in the reading by him of the gage staff, and not through carelessness in setting the pen on the chart. Moreover the setting of the pen on the chart is checked from time to time by visiting hydrographers of the State, or the water commissioner, and at times by myself while on trips of inspection. Absence of such notations on the chart indicates that the chart reading corresponded with the gage reading when the pen was set upon the date by any of the individuals mentioned.

In my judgment the chart from all the registers in question, constitute a record as good on the average, as those ordinarily obtained from such equipment under similar conditions. Moreover, when the observer changes the automatic register chart and sets the pen on the new chart, if there are any errors they will be disclosed by any discrepancies between the pen reading on the chart when the same is removed, and the pen reading on the new chart when the latter is placed on the (1853) register. This constitutes a very good check as to the accuracy or action of the observer in referring the pen chart to the gage staff reading. I have heretofore detailed the willingness of myself and other state officials to make an effort to meet any reasonable request of Wyoming with respect to measuring devices, and exchanging records so that that state may satisfy [fol. 1125] itself as to the correctness of our records and the sufficiency of our equipment. My attitude now is that I should be very glad to have the present State Engineer of Wyoming go over all the measuring and recording equipment on the canals or ditches diverting water out of the Laramie River Basin into the Poudre River Basin, and suggest any changes or improvements he may feel needful in such devices, after which I shall issue instructions to the owners of these diverting agencies to make such repairs or betterments which the State of Wyoming may require. I would also be glad to enter into a co-operative agreement with the State Engineer of Wyoming, which would provide for his co-operation in the measurement by such devices (1854) at any time he may see fit to make such measure-

ments, and for a complete check of all the work done by my office in this regard, and will also furnish him a copy of the records of all such diversions and of all records obtained, to the end that Wyoming may be fully satisfied at all times with respect to the sufficiency and character of the data obtained. I am also convinced that the Colorado agencies which own the trans-mountain diversions, concerning which we have been testifying, will extend their full co-operation in carrying out such pledge to Wyoming. My willingness to co-operate is just the same now as it was at the beginning of this case.

Cross-examination.

By Mr. James A. Greenwood:

I have complete charge as chief administrative officer of the State of Colorado, with respect to the measurement and control of water diversions, but not as to the authorization of (1855) such diversions. That is, I am authorized to [fol. 1126] limit or control a diversion that has been authorized by adjudication of the Court in order to keep such diversion within the limits of that adjudication. Assuming that the need were critical, and the necessity for accurate measurement and careful administration were necessary, then I would say that the characteristics of the necessary equipment or installation for the proper measurement of water would be the same as those I have indicated in connection with the diversions of water by the Skyline Ditch. There are many installations of flumes in the State of Colorado, where they are not installed on a straight channel approach to the throat of the flume, yet we do attempt to locate the rectangular flume, on a straight section of the ditch, but that is not absolutely necessary.

(1856) Referring to the statement made heretofore by Mr. Patterson, a witness for defendant, to the effect that it was a fortunate condition that the bend in the channel was present in connection with the location of the Parshal flume at the outlet of the Laramie Poudre Tunnel. It is my opinion that where the velocities of flowing water are very high and substantially greater than the velocity of discharge through the throat of the Venturi flume, that it is very desirable to have the velocity of approach in some way checked. This right angle in the concrete structure at the outlet of the Lar-

amie Poudre Tunnel does check the high velocities of water issuing from the tunnel, and by so doing turns them into the Venturi flume at a lower velocity of flow.

The channel of the rectangular concrete structure above this flume is much wider than the flume itself. The velocities coming from the tunnel are checked by impinging upon [fol. 1127] the (1857) sides of the flume, thus performing a result somewhat in the nature of a stilling pool, and this condition undoubtedly is one that is desirable in this particular instance. Such a stilling basin, however, is not of sufficient capacity to receive all of the water that may come through the tunnel at a violent or critical velocity and hold it there and ease it out over a period of 24 hours. The explanation for this situation is a hydraulic question, which may be a little difficult to make clear. The facts are that the concrete structure immediately adjacent to the outlet of the tunnel is of a larger cross-section area than the area of the tunnel itself. Water flowing from a restricted area into a larger area has its velocity reduced in proportion to the two areas and due to this fact the velocities of the water issuing from the tunnel is reduced.

(1858) I have never visited the section or locality of the Bob Creek Ditch nor the Columbine Ditch. I have been in the location of what is known as Lost Larimer and Lily Lakes, although I have never seen Lily Lake. I have read and studied the decree of the United States Supreme Court of June 5, 1922, and also the modified decree of October 9, 1922, as well as the opinion of May 31, 1932, in the case of Wyoming vs. Colorado.

(1859) I have felt that the award of water to Colorado by the Court Decree was in the nature of a mass allocation, and was not necessarily restricted to the several agencies which have been diverting such water. If there should be no further extension or interpretation of the decrees of the Supreme Court in this matter, I think I would again prevent any diversion by the Bob Creek Ditch until the Supreme Court had made final disposition of the matter.

Under the ruling of the Supreme Court of May 31, 1932, as an administrative official there was some question in my [fol. 1128] (1860) mind, as to the right of those two ditches to continue to divert water, and under such conditions I would prevent further diversions of water to be made until the matter was clarified by the Supreme

Court. In my opinion, as an administrative officer, the ruling of the Court on May 31, 1932, did not make a final disposition of the water of the Laramie River. I feel that it is my duty as an administrative officer to see to the best of my ability that the United States Supreme Court Decree is observed. I am not an attorney and as an administrative officer I may err, but I feel that I have endeavored to comply with the Supreme Court Decree so far as I was able to interpret the same and it is certainly my desire to comply therewith.

(1861) Soon after the ruling of the Supreme Court on May 31, 1932, which ruling did not come to my attention until about June 15, 1932, I sought an opinion from Attorney General Ireland of Colorado, with respect to what I should do in allowing Bob Creek and Columbine Ditches to continue to divert water.

After I made this verbal request of Attorney General Ireland, I was compelled to leave my office for a day or two, and upon my return to Denver, a little after noon on June 17, 1932, I was advised by Attorney General Ireland that while he felt the decree of the Supreme Court awarded to Colorado a mass allocation of water, and that these two ditches, Bob Creek and Columbine Ditches would be entitled to divert water under that decree, yet as the chief administrative officer of the State, and for the protection of my department, that I should order those ditches closed down [fol. 1129] until the Court made a final disposition of the whole matter. I immediately telephoned the headgate keeper, Mr. Powell, of the Columbine (1862) Ditch about six o'clock that evening, June 17, 1932, directing that he close the headgate of both the Columbine and the Bob Creek ditches. He advised me that the head of the Columbine Ditch would be closed immediately that evening, but that it would require until the next morning for him to reach the head of the Bob Creek Ditch, some miles distant, but that he would go there directly and close the headgate. He reported to me the following day or two, and from inspection of the automatic register charts of those two ditches, I found that they disclosed that the headgate of the Columbine Ditch was closed about six o'clock on the evening of June 17th, and that of the Bob Creek Ditch about eight o'clock on June 18th, 1932, and it is my understanding that no further diversions by such ditches have been made since that time.

(1863) I have not heard the testimony given by Mr. Portner of the Mountain and Plains Irrigation Company, although I understand he has testified in this case. I have not talked with Mr. Portner for months and do not know what that company's present attitude is with respect to their right to continue (1864) to divert water through the Bob Creek Ditch. As I have heretofore stated my position always has been that the right of the Mountain and Plains Irrigation Company to divert the waters of (1865) Bob Creek, were included in the mass allocation, as one of the diverting agencies the State of Colorado recognizes. However, in matters of law, I usually refer such questions to the Attorney General of the State before acting. And any future action that I may take with reference to that particular diversion would be dependent upon the advice given me by the Attorney General of Colorado. If I am correct [fol. 1130] in my opinion that this is a mass allocation made to the State of Colorado under the Supreme Court Decree, I would permit the several agencies in Colorado to divert water in order of their respective priorities, whenever such diversions interfere with one another. It is true that the Mountain and Plain System, as well as the Sand Creek, or Wilson Supply System, can divert water at the same time that the Skyline or the Laramie-Poudre diverts, but whenever such diversions interfere among themselves they would be administered strictly in order of priority under Colorado's law.

(1866) There is only a comparatively short season when water can be diverted through the Bob Creek or Columbine Ditches. As I understand the meaning of that question under the Supreme Court Decree, any recognized agency of Colorado would be permitted to divert, during the brief period of time I have (1867) just mentioned, as long as it could divert. If near the end of the season it should appear that 37,750 acre feet, the stated allocation, in addition to that relatively small quantity appropriated by the Wilson Supply System, would exceed that amount, then some ditch would have to be shortened in order to keep within the 37,750 acre feet.

As an administrative officer, it would be true that I would not limit diversions strictly in accordance with the recognized appropriations, as referred to in the Supreme

Court Decree, but rather would permit all the diversions that wanted to take water in the watershed, up to the amount of 37,750 acre feet, each year.

By the term recognized agencies, I refer to ditches which are recognized by the State of Colorado. I am bound under our Colorado law to recognize the right of any Colo- [fol. 1131] rado ditch to divert, but if the summation of those diversions in any one year, would exceed 37,750 acre feet, I would feel it my duty to cut short any priority at the end of the season in order to keep the total amount diverted within 37,750 acre feet.

(1868) We keep a record of the daily diversion of each of those agencies, with which we are dealing in this litigation. At any time during the season we can determine what the total diversion is up to that time, for that year.

Eliminating the amount appropriated by the Sand Creek system from Deadman Creek I would feel required under the laws of Colorado to recognize the right of the Columbine Ditch to divert water from the Laramie River to the Cache la Poudre Watershed, so long as the aggregate amount of water taken by all diverting agencies, including the Skyline, Tunnel, Bob Creek Ditch, the Columbine ditch, the Lost Lake System and the meadow lands had not exceeded 37,750 acre feet. As I have testified, I feel that under this mass allocation by the United States Supreme Court Decree, it did not intend to limit the total mass allocation to any particular (1869) agency; that is my interpretation of the decree and certainly if that should be found to be incorrect, I am going to be bound by the decree of the United States Supreme Court. Until further advised I would feel it within my rights as State Engineer, to control the diversions of water in this state permitting the Bob Creek Ditch and the Columbine Ditch to divert water under my interpretation of the Supreme Court Decree.

I have considered the "Lost Lake System", which is the property of the Water Supply and Storage Company, as one of the diverting agencies of that Company and coming [fol. 1132] within the mass allocation to the State heretofore referred to.

(1870) There is no physical connection between the Lost Lake System and the Sky-line Ditch, but they are owned by the same people. In the years 1927, 1928 and 1929, the former system was in operation and known as the Lost

Lake System, and I do not now recall without referring to my notes whether during each of those years the Skyline Ditch alone diverted in excess of 18,000 acre feet of water. During those years the Lost Lake System enabled the Water Supply and Storage Company to take through their system more than 18,000 acre feet. In the official records of the office of the State Engineer of Colorado, the annual diversions thru the Skyline Ditch during any year in question do not include waters of the Lost Lakes System.

(1871) I have not stated that the Skyline Ditch is limited to 18,000 acre feet. The several amounts that the Skyline diverts, through both the Skyline ditch and through the Lost Lakes System are part of the mass allocation of 37,750 acre feet.

In my judgment as a State official, the Skyline ditch is not limited to 18,000 acre feet in a year, so long as the total diversions by all the agencies of Colorado above mentioned would not exceed 37,750 acre feet. We have taken the position all along that this was an allocation of water to the State of Colorado and its agencies, and if we do not exceed the diversions of 37,750 acre feet by all those agencies in any one year, we could not and would not be injuring the State of Wyoming.

If the Skyline Ditch should divert in excess of 18,000 acre feet in any one year, it would be in my judgment doing so legally so long as the total diversion made by all agencies of Colorado did not exceed the 37,750 acre feet.

(1872) In my opinion I would have no authority to object to a diversion of water from the Laramie River through the Tunnel by an additional canal if such right is recognized [fol. 1133] in the Courts of Colorado. In my opinion the recognized appropriator might extend its diversion works commonly called the "West Side Collection Ditch", beyond Rawar Creek and tap McIntyre Creek and divert those waters, without violating the United States Supreme Court Decree so long as the total diversion by the Tunnel in any one year does not exceed 15,500 acre feet, the amount designated in the decree to be for the use of the Laramie Poudre Tunnel. That is the one agency of the State of Colorado which I recognize definitely as being limited to 15,500 acre feet. I also believe it would be legal to construct in the future what is referred to as the "East Side Collection Ditch", tapping Deadman and other creeks and delivering

such waters to the mouth of the Tunnel, so long as 15,500 acre feet is not exceeded in any one year. In other words, it is my (1873) belief that the State of Colorado could legally recognize the construction of any kind of diversion works on the Laramie River watershed for the collection and delivery of water from that watershed to the mouth of the Laramie-Poudre Tunnel, so long as the aggregate did not exceed 15,500 acre feet. But in this connection I would limit my statement to agencies that have heretofore been recognized by the State of Colorado. I would not extend my recognition to new works that had never been contemplated, by the claims of that Company.

Under the United States Supreme Court Decree of June 5, 1922, while I do not at this time recall the sources that were mentioned in the decree of the Supreme Court, it is my belief that future diversions or extensions of existing works could be made to tap any source of water [fol. 1134] originating in the Laramie River Basin in Colorado, so long as the total amount of water diverted did not exceed 37,750 acre feet.

In your question Mr. Greenwood, you state that the rec- (1874) ord discloses that nothing of any consequence has been done towards the construction or the completion of the East Side Collection Ditch for approximately 15 years. Assuming such to be true it is my understanding that this ditch if completed would have the right to divert water so long as the total did not exceed 15,500 acre feet in any one year.

It is my understanding that under the appropriation recognized by the United States Supreme Court Decree, the Greeley-Poudre Tunnel is limited under the laws of the State of Colorado to the use of works heretofore initiated for diverting from the West Branch of the Laramie River and tributaries, and East Branch of the Laramie River and tributaries. The tunnel would be limited in its diversions to the sources of diversion and supply named in the adjudication proceedings under the laws of the State (1875) of Colorado. I know generally from hearsay and a study of maps, about the Sand Creek Ditch System, or otherwise known as the Wilson Supply System, but I have never been over that system.

As I recall, the Sand Creek Ditch System consists of the Columbine, the Deadman Ditch and Feeder Ditch and the

Sand Creek Ditch proper. As I recall, that system has a decree for 288 second feet as of June 15, 1899.

It is fundamental under the laws of Colorado, that a ditch shall not be decreed a greater amount of water than the testimony in the adjudication proceedings shows it has a capacity to divert, but nevertheless it has frequently occurred in this state that water in excess of such capacity [fol. 1135] has in fact been (1876) decreed by the Court.

Upon inspection of Defendant's Exhibit "G" and page 7 under title "No. 36, Sand Creek Ditch System", I am not prepared in the absence of the actual decreetal order of the court to say that the order gives the capacity of the Deadman's Creek ditch, as 117 cubic feet per second of time. The reference you make to that particular part of Defendant's Exhibit G appears to apply more to the nature of the findings of the court than the decree itself. If the Decree fixes the capacity of the Deadman's ditch at only 117 cubic feet per second of time, then in the absence of anything to the contrary, else the amount of diversion would be limited to that figure. If, however, the decree itself says that this ditch is entitled to divert 200 feet per second of time, then I, as an administrative officer, would be bound to recognize such quantity.

(1877) As an administrative officer, of interstate streams, and where appropriations have been made in the different states through which the stream runs the only rule or guide that I could follow would be the decree of our own courts in the absence of an interstate agreement (1878) or Supreme Court decision determining the relative rights between the two states. And, in the absence of any decision of the United States Supreme Court to the contrary or an interstate river compact, as an administrative officer I could not recognize appropriations made to users further down the stream under the laws of another state. I assume that the gage rod in the stilling well in the Venturi flume at the Laramie-Poudre Tunnel was set .16 of a foot in error at the [fol. 1136] time the flume was installed in May, 1927. The installation was made under the supervision of Mr. Ralph L. Parshall. I do not recall in the absence of the official records of my office that I furnished any special rating table to Mr. McAnelly, Water Commissioner of District No. 3, for the Parshall improved Venturi flume at the tunnel at a later date than June 1927.

(1879) It is my feeling that it was not necessary to provide a rating table for this Venturi flume subsequent to May 1927. I did make a check current water meter measurement of the Laramie-Poudre Tunnel in July 1932. Testifying from Defendant's Exhibit T-1, which is a compilation of the measurements made at the tunnel on this Parshall flume, this record shows that Mr. Ralph L. Parshall, and former State Engineer John E. Field and myself made two measurements there on July 5, 1932.

(1880) Referring to Sheet 7 of Complainant's Exhibit 59, the same being field notes covering the measurement of July 5, 1932, it appears that the date is not complete on that Exhibit, but I identify the measurement from my diary notes. The field notes of that measurement were kept by R. L. Parshall, while the current meter was handled by myself, and in column 3 thereof appears the notation "two-tenths." It is evident that there is either something lacking there to show it was a combination of the two-tenths eight-tenths point method, or that it was the six-tenths point method, based upon the depths of water as shown in the flume at that time. My recollection is that upon the occasion of our visit to the Venturi flume at the East Portal of the Tunnel on July 5th, that Mr. Parshall took one or more photographs of the same.

(1881) (Plaintiff's Exhibit 88, same being a photo was marked for identification.)

[fol. 1137] This exhibit is a photograph and I think it correctly portrays the physical conditions existing at the Parshall improved Venturi flume at the East Portal of the flume, at the time of our visit on July 5, 1932. In the photograph the party shown on the right-hand side with his back toward me is John E. Field, former State Engineer of the State of Colorado. The party on the left-hand side of the picture is myself. On that date I made a check measurement of the Venturi Flume at the tunnel which shows a mean gage height of 1.15 and a discharge of 36.52 second feet.

(Complainant's Exhibit 89, marked for identification.)

This exhibit consists of the original field notes and data that were obtained at the time we made the current meter measurement on July 5th, 1932, above referred to.

(1882) I do not recall, although the records of my office may so disclose, whether Mr. Baily in September, 1928, in

his capacity of Chief Hydrographer of the office of the State Engineer of Colorado made a check measurement of the Venturi flume of the Laramie-Poudre Tunnel, which showed a discharge of 11.86 second feet. After examining what purports to be a blue-print copy of such field notes, I do not recall ever having seen them before and would not say that it is a true record. I will, however, examine the records in the office of the State Engineer and attempt to learn whether such field notes are on file there.

I will say that at the time all of the measurements on this particular flume were requested by Mr. Meeker, we caused a (1883) search of the records to be made in my office, and we submitted all the records we could find at that time. If any have been overlooked we will be glad to make further search.

[fol. 1138] The letter which you have handed me purports to be a carbon copy of a letter written from the office of the State Engineer on October 5, 1928, and refers to the Baily measurement, but I am not prepared to say that it was written by me until a search of the records of my office are made, which I will be glad to have done.

It is my belief that the Bob Creek and Columbine Ditches are not diverting any water during the present season, although I have not personally been at the head of these two ditches and therefore could not state under oath that absolutely they are not diverting water at this time. If they are diverting they are not doing so with my consent, as I ordered them not to make further diversions.

(1884) Mr. Greenwood: I think that is all.

Redirect examination.

By Schrader P. Howell:

In my testimony this morning in respect to Defendant's Exhibit T-1, I inadvertently did not include in my statement a list of all the measurements made on my visit to the Parshall Flume at the Laramie Poudre Tunnel outlet in May, 1927. I then testified that two measurements were made by me on that date, one giving a discharge of 8.33 second feet, and one a discharge of 20.98 second feet. I also stated that I made a check measurement on that date, which checked within a fraction of a cubic foot per second of my former measurement. As I recall the check meas-

urement gave 20.51 second feet, all three measurements made by me being shown on Defendant's Exhibit T-1. The numbers of these three measurements as they appear on this Exhibit are 3, 15 and 16. The testimony which I gave in answer to Mr. Greenwood's question this morning with respect to the interpretation of the United States Supreme Court Decree was given not as a lawyer but in my capacity as an administrative officer.

[fol. 1139] (1885) As such administrative officer of the State of Colorado I would be guided by the opinion of the Attorney General of the State, as to the proper interpretation to be placed upon a decree of the United States Supreme Court.

I further stated to Mr. Greenwood that I would be guided with respect to diversions, in administering the water priorities in this State by the laws of Colorado, but that is upon the assumption that there was no decree of the Supreme Court of the United States directing me to do otherwise. It would be my purpose and desire to comply strictly with the provisions of the United States Supreme Court Decree. In the absence of such a decree I would be guided in my administration of water priorities by the laws of the State of Colorado.

Recross-examination.

By Mr. James Greenwood:

The decrees made by the Courts of Colorado in connection with the water administration are ordinarily sufficiently clear that it does not require construction by the Attorney General of the State. Sometimes, however, a decree is ambiguous and under such conditions I get an opinion from the Attorney General. Unless there is something ambiguous in the decree, I usually rely upon my own judgment and do not feel it necessary to obtain a legal opinion.

Mr. Greenwood: That is all.

[fol. 1140] JOHN E. FIELD, witness in behalf of defendant.

Direct examination.

By Mr. Shrader P. Howell:

(1887) My name is John E. Field. I was born in the State of Colorado, which has been my home ever since. My profession is that of a Civil Engineer. After graduating from the Public Schools, I went to Yale University and graduated in the Scientific School of that University, giving particular attention to hydraulics, and in my post-graduate course, I took up mining engineering.

(1888) In 1897 and 1898 I was State Engineer of the State of Colorado, and in 1901 and 1902, I was Special Deputy in the State Engineer's office, having, particularly, charge of the field work and at that time we were developing the proper method of measuring water to which study I devoted considerable attention. During that period I studied also the matter of flow of water so as to enable myself to use the method which in my judgment was more practicable to the particular condition involved. I was again State Engineer in 1913 and 1914, and later was a member of the State Land Board for six years, and my particular duty during that time was to supply the State lands with water. In 1903 I entered the Reclamation Service of the Government, and continued in that employ until the summer of 1907. At other times I have been in private practice in designing and locating irrigation projects, and determining the proper amount of water and the proper structures to be installed, and such duties have always involved the instrumentalities for the proper measurement

(1889) of water.

During the several terms as State Engineer of Colorado, I had occasion to investigate the comparative value of the [fol. 1141] different methods of measuring water and the merits of the measuring devices in the proper installation of measuring flumes and establishing rating stations.

(1890) After I left College in 1889 I went into the mines and had to take up the matter of the handling of water in pumps and the development of hydro-power and it was not until 1897 that I confined myself exclusively to irrigation problems.

(1891) As State Engineer I have had experience in the preparation of and appearing as a witness in interstate water controversies, and I was consulted and acted as engineering adviser in the original case of Wyoming vs. Colorado, and other inter-state water litigation.

In 1900 I made an investigation of the trans-mountain diversions of water with respect to the Cache la Poudre River and particularly of the Big Thompson, and prepared a bulletin concerning the physical condition of those streams, which was published by the U. S. Geological Survey and in 1913-1914, I spent almost entirely in investigating the Laramie River and the Cache la Poudre River.
(1892) In 1932 I was engaged especially to keep track of the water on the Cache la Poudre River, to ascertain whether there were any errors being committed, any injustices, to see whether the water was being properly distributed and particularly to watch the trans-mountain diversions and to study the adequacy in administration of the water decrees, and the methods used in measuring the water. I represented a number of water users of the Cache la Poudre River, and particularly the Windsor Reservoir and Canal Company, and my instructions were to ascertain the facts, to check up on the water commissioners in [fol. 1142] districts 1, 2, 3 and 64, and to study the conditions with a view to suggesting improvement and correcting errors or discrepancies or favoritism that might be found. If I found efficiency, diligence (1893) and thoroughness, I was to so report to the end that the unrest and dis-atisfaction and imaginary faults etc., might be eliminated. And, if on the other hand I found that they were being fairly dealt with as water-users, I was to so report that situation. The object was quite as much to allay any fears of unfairness or favoritism if they were unfounded, as it was to catch any errors on the part of the water officials.

I finally reported that the efficiency and diligence used was of a very high order, and the water-users' suspicions were mostly unfounded, and while there were differences in detail, taking the season as a whole, I really found no fault and the only thing I recommended was that my clients from time to time keep track of what was going on, so as to keep the officials on their toes. I made the further recommendation, that generally speaking the Parshall flume should be

substituted for the rectangular flume whenever repairs were made and the new flumes installed. There are certain physical conditions existing as to a particular ditch where the (1894) use of the rectangular flume would be advisable and would be quite as good as the Parshall flume. I spent most of my time in making this special investigation in District No. 3, in Colorado, in checking up their trans-mountain diversions, which includes the Cache la Poudre Basin. My employment was by private individuals and companies, in which the State was not interested at all. (1895) I went into the Cache la Poudre Basin District No. 3 in Colorado and other districts which I have named, with [fol. 1143] the specific purpose of searching and checking up to ascertain whether or not the measuring devices were being properly operated and whether or not these individual appropriators in that Basin were receiving the proper amounts of water with which they were being charged. In speaking of trans-mountain diversions, I mean to include the diversions from the Laramie River and the Cache la Poudre River, also from the Grand and from the Michigan.

Further direct examination.

By Mr. Lawrence R. Temple:

In 1926, I had occasion to examine the system of the Water Supply and Storage Company and make a report from that examination to the International Trust Company and Bosworth, Chanute and Company of Denver, Colorado, which report was made in connection with the prospective loan for (1896) refinancing of the system. The report covered a description of all physical properties of the Company and went into the water supply, that is the company's rights and the amount of water that they diverted and so forth, in fact it was an appraisal report. In 1926 I found the value of the physical works and the water supply of the Water Supply and Storage Company to be $4,192,807. The Water Supply and Storage Company is a mutual ditch company and is supported by assessments made upon the stockholders, the water being divided proportionately among all of the owners of the stock. The trans-mountain diversions (1897) of the Water Supply and Storage Company as shown by the above referred to report, consists of

the Grand River Ditch, the Michigan and the Skyline, the Cameron and the Lost Lake System and Chambers Lake. [fol. 1144] I have personally known that the Water Supply and Storage Company has operated these trans-mountain diversion works since 1897.

Further direct examination.

By Mr. Shrader P. Howell:

In the findings and report which I made to my clients as a result of the investigation of the water distribution in the Cache la Poudre Basin, I found that they were being fairly dealt with. That the water was being recorded and reported and that the amounts that were being brought over were correct. I also reported that the water officials of that district were unusually intelligent, experienced and diligent, and that I did not find any facts that indicated to me that irregularities, improper or careless administration, were (1898) being exercised.

Mr. Howell: You may examine.
Mr. Greenwood: That is all, Mr. Field.

[fol. 1145] (1899) R. J. Tipton, witness recalled in behalf of defendant for further direct examination:

(1900) As I have heretofore testified, I am employed by the State of Colorado as Special Engineer in charge of interstate river investigations, and water resource surveys for the State Engineer, and Interstate River Commissioner. My duties consist in making an analysis of the stream flow of all the streams that originate in Colorado, determining shortages that exist and the means for relieving those shortages, and in connection with interstate matters to analyze the flow of streams that are interstate in character and the uses that are made of those streams, not only in Colorado, but in the neighboring states through which those streams flow and in which the waters of such streams are used.

It is frequently necessary for me to determine the acreage that is irrigated in various basins in the State and for that purpose to take and consider such information as

is published in various official reports and records. I frequently find material discrepancies in officials reports, particularly those that give quantities to represent irrigated acreage. (1901) For example, two Government reports on irrigated acreage—one, the Census report which is made ordinarily every ten years; and another report is prepared by the Bureau of Crops Statistics. That report is published in this State by the Bureau of Immigration that appears in the Year Book, the official publication of the Bureau of Immigration. That report compiled by the State is based upon information supplied by the Water Commissioners. I never have found in any estimates where those official reports check as to any particular area. They are correct enough for the purpose for which the data was collected.

In 1924 it became desirable in the course of my work and investigations to determine the actual amount of irrigated acreage in the San Luis Valley.

[fol. 1146] (1902) We investigated all available official reports, including the United States Census report, Water Commissioners' reports and the reports published in the Year Book of the Bureau of Immigration, which had been collected by the Bureau of Crops Statistics. In 1910, the United States Census reported 608,924 acres irrigated in the San Luis Valley. The Water Commissioners' reports for 1924, which was the year in which we started investigation, reported 615,178.25 acres. Those two reports checked fairly well because the source of information is the same. The Year Book gave a cropped acreage of 246,202 acres. We took those two reports, went through them in detail and finally deduced from all these reports that there were 425,000 acres actually irrigated. After that we made a cruise of the irrigated area in the San Luis Valley to actually determine in the field what the true situation was and as a result we found to be 494,000 acres actually irrigated. That did not check with any of the official reports, yet the official reports were correct for the purpose for which the information was gathered.

Another instance which came under my observation when I was with the United States Bureau of Reclamation in 1929, at which time we were making water supply studies for the Hoover (1903) Dam. It became necessary to determine the area of land that was actually irrigated above

the site of the reservoir. We wrote letters to various State Engineers and other officials within the Colorado River Basin lying above the site of the Hoover Dam. As one example, we received reply from the State of Wyoming, including a tabulation made by Mr. Meeker and Mr. Goodrich, which gave the acreage irrigated in the Green River Basin in Wyoming of 543,000 acres. The United States Census in 1910 gave the acreage as 211,507 acres. A report [fol. 1147] prepared by the United States Bureau of Reclamation, known as the Weymouth Report, which was prepared in 1922, gave 235,000 acres. The United States Geological Survey Water Supply Paper No. 618, published in 1927, gave 235,000 acres, the same as the Weymouth report. In the absence of time necessary to make an actual field survey, we adopted the figure of 300,000 acres. Those are instances that indicate discrepancies that at times exist between official reports as to irrigated acreage, and, as I say, they can all be considered accurate, for the purpose for which they were gathered.

(1904) I am familiar with the method generally employed by the Water Commissioners in the various districts in Colorado in determining the amount of water diverted by the various canals and ditches in their respective districts.

There are three or four districts in the State where the Water Commissioners obtain the amount of water diverted by the canals daily. One of such series of districts is the Askansas River Basin below Pueblo. In that division or portion of that division below Pueblo, report is obtained from the canals twice a day and published for the benefit of all users on the stream. In District No. 20 in the Rio Grande River Basin in San Luis Valley, the reports are made twice a day to the Special Deputy State Engineer who is employed in the administration of that district, and are published once a day. In another division embracing the La Plata River in this State, reports are made once a day.

(1905) In District No. 3, the Cache la Poudre River Basin reports are gathered very carefully, and the reports as to the trans-mountain diversions into the Cache la Poudre Basin are determined each day and in the dis- [fol. 1148] tricts along the South Platte River in general the reports as made by Water Commissioners are made rather carefully.

In general I think the reports made by the Water Commissioner in District No. 3 are probably on a par with the reports made by the Water Commissioners in Division No. 2, below Pueblo, and by the Special Deputy State Engineer in charge of District No. 20 in the Rio Grande River Basin in the San Luis Valley.

In my opinion the reports made by the Water Commissioner of District No. 3 of the trans-mountain diversions are more accurate than reports made by any other water district of the State, because those reports are determined and made from the records of the automatic charts by determining the hourly quantity of water that has flowed past the particular points in question and from the hourly quantities are determined the daily quantities.

(1906) I began my work as engineer and hydrographer. I have installed rating stations on all streams that supply water to the holdings of the San Luis Valley Land and Cattle Company, which comprises 100,000 acre tract of land. During the installation of the stations I supervised the construction of the control devices, installed automatic registers. During the time I was in private practice in the San Luis Valley from 1922 to 1928, one of my duties was to take care of the ratings and in general to supervise the maintenance of the gaging stations maintained by all the canal systems for which I was engineer. It was necessary in that connection to make frequent ratings of various flumes as well as prepare rating curves and rating tables.

I am familiar with what is known as the rectangular (1907) rating flume. In this connection I speak only so far as my experience in the San Luis Valley is concerned. In that valley where the water is clear in general and the [fol. 1149] land is at such an altitude that there is not a prolific growth of vegetation in the canals, the rectangular rating flume has given very excellent service. I have known some rating flumes in that locality that have gone probably for five years and the same rating curve as prepared originally was good at the end of that period.

I think I installed the first Parshall flume that was installed in the San Luis Valey.

(1908) I think I have inspected all the Parshall flumes that have been installed on the main canals in the Arkansas River Basin below Pueblo. The Parshall flume has demonstrated itself to be a very accurate measuring device and

has been so accepted by the engineering profession, evidenced by its very large and extensive use. It is superior to the rectangular flume in that it does not require frequent ratings, it having been calibrated in the laboratory, and it is so constructed that the conditions which make a rectangular flume somewhat inaccurate at times will not so affect a Parshall flume. In some conditions a rectangular flume, in order to keep it operating and accurately recording the flow of the water requires very frequent ratings on account of the change conditions in (1909) the channel. That, however, does not apply to the Parshall flume, because its construction causes it to keep itself clean of gravel and other debris that might lodge in a rectangular flume. From my observation and experience as an engineer, I think the rectangular flume when properly maintained and supervised is an accurate device for measuring stream flow, but it does require more care under ordinary conditions than the Parshall flume.

I am familiar with the gaging stations maintained on the Skyline ditch and the Laramie-Poudre Tunnel, and the Sand Creek Ditch in Colorado. I visited the Skyline flume in 1930-1931 and on June 10th, 1933 and also visited and [fol. 1150] inspected the rating flume at the outlet of the Laramie-Poudre Tunnel and the rating flume on Sand Creek only once and that was on June 10th of this year.

On the trip inspecting these flumes made on June 10th and 11th of 1933, there were in the party Mr. Bull, Consulting Engineer for the Water Board of the City of Denver, Professor E. B. House, of the Colorado Agricultural College, Mr. Potts, Engineer for the Water Board of the City of Denver, Mr. C. L. Patterson, Consulting Engineer of Pueblo, Mr. Charles McGraw, one of the official hydrographers of the State Engineer's office, and Mr. McAnelly, Water Commissioner of District No. 3, (1910) Cache La Poudre Valley, and myself.

At the Laramie-Poudre Tunnel we found a rather large head of water flowing through the flume, amounting to 100 second feet. There was considerable gravel in the concrete channel which leads from the tunnel to the flume and a very large deposit of gravel immediately above the mouth of the flume on the right hand side, looking down stream. The water was emerging under a very high velocity and flowing into a stilling basin, which is created by a right angle turn,

which exists in the concrete channel leading from the outlet of the Tunnel to the flume. Despite the turbulance caused by the gravel deposits at the entrance of the flume, the water passed through the flume in a more or less uniform condition and passes over the crest of the flume, which is the control point of the flume, I would say in an absolutely regular manner. We found the automatic register which was installed at the flume was correctly operating. The pen was set to correspond with the staff gage reading in the well. I observed no sand or gravel in the throat of the flume.

(1911) The water was measured at the time of our visit by means of a current meter manipulated by Mr. Harry Potts and Mr. Charles McGraw. While there I took some pictures of the tunnel and flume at the outlet of the Laramie-Poudre Tunnel.

[fol. 1151] (Defendant's Exhibit W-2, consisting of six photographs, were marked for identification).

These six photographs were taken by me of various portions of the channel leading from the outlet of the Laramie-Poudre Tunnel to the Parshall flume installed at that outlet. The pictures show the condition of the flow at the various points covered, showing the flume itself and one of the meter (1912) measurements in process of being made. These photographs correctly protray the conditions that existed at the time they were taken.

Picture No. 1 is a view looking toward the outlet portal of the Laramie-Poudre Tunnel. It is taken from the top of the concrete wall near the right angle bend in front of the portal, about 40 feet distant from it. The point from which (1913) photograph number 1 was taken is shown by the red arrow, which appears on photograph number 2. This photograph shows the water emerging from the tunnel with great turbulence caused by the high velocity with which the water is emerging, and by the rocks deposited in the channel leading from the tunnel to the right angle turn. All of these pictures pertain entirely to the East Portal of the tunnel.

Picture No. 2 is a view of the straight channel leading from the portal of the Tunnel toward the right angle turn and is taken from the top of the wall on the left side of the

channel leading to the measuring flume, as shown by the arrow on photograph number 3, designated by figure 2. On the right hand side of the photograph can be seen the water as it emerges from the portal of the tunnel and on the left hand side can be seen the right angle turn, and the effect that that turn is having upon the dissipation of the high velocity which the water had as it emerged from the tunnel. [fol. 1152] (1914) Picture No. 3 was taken from a position near the right angle turn, and that is indicated in photograph No. 3 by the arrow, which is marked No. 3. It is taken looking directly down the channel which leads to the Parshall flume, which is some 80 feet from the point from which the photograph is taken. It will be noted that the water as it progresses down the channel from the right angle turn is becoming quieter and more regular in flow as it progresses down the channel toward the flume.

Picture No. 4 is a closer view of the flume itself, showing (1915) the water entering the flume and shows Mr. Potts in process of making measurements. This photograph is taken from the top of the left hand wall looking down the stream from the point indicated by figure No. 4 and the arrow in photograph No. 3.

It will be noted from this photograph that the water is flowing over the crest in a very uniform and regular manner. That is the entrance to the throat of the flume and is the control point which determines the amount of water passing through the flume.

(1916) Picture No. 5 is taken from a point down stream looking toward the flume. It indicates the discharge from the flume and again the crest of the flume can be seen, which is indicated by the black arrow near the center of the picture which points vertically and is superimposed upon a joint in the planks which go to make up the flume. It may be noted from this photograph that the water is flowing over the crest and through the throat in a regular manner, and is emerging from the flume without any apparent cross-currents or bad distribution of velocity.

[fols. 1153-1155] Picture No. 6 is a view taken from the position marked No. 6 on photograph No. 3, and shows the turbulence caused by deposits of gravel near the entrance of the flume at the (1917) right hand side looking down stream. Mr. King, the gage reader told us at the time of our visit that this deposit of gravel was one of the

largest he had seen in the flume and was caused by the sudden turning out of the water from the Skyline ditch on account of a threatened break, which caused a very large head of water to suddenly pass through the tunnel, collecting gravel and rock on its way, which in turn caused this deposit. That occurrence is plainly noticeable on the chart installed upon the automatic register. There was however no gravel present in the throat of the flume at the time of our visit.

(Defendant's Exhibit W-2 is offered in evidence and here as copied.)

Exhibit W-2 omitted. Printed side page 3142 post.

[fol. 1156] This Exhibit U-2 is a very good portrayal of the Venturi-Parshall flume as I observed it. I made no (1918) measurements myself, but from a general standpoint it appears that they are probably correct. The picture itself on the side along the wall leading down stream toward the flume might give the impression that that portion which is termed "Tunnel dump" is a rise. That is not true because the dump breaks off precipitously, and the mountain itself is almost immediately on the other side of the wall on the right hand side of the channel leading downstream.

That portion of the drawing labeled "stilling basin," is a large basin about 40 feet wide at its widest place, and about 45 feet long. The cross sectional area of that basin is very much larger than the cross sectional of the tunnel itself, so that the water emerging from the tunnel tends to spread out which of course materially decreases the velocity. In the bottom of the still-well there are some symbols representing I presume, sand and gravel. Of course we could not see the bottom of the still-well, so that I do not know whether that (1919) was the condition at the time of our visit, on June 10, 1933.

The drawing indicates very clearly the construction of the Parshall flume, showing the converging sides and the throat which is much narrower than the channel leading to it. It shows the crest of the flume and the outlet from the flume with the converging side and incidentally in connection with this flume, the entrance of the flume is much longer than the entrance of a standard six foot Parshall [fol. 1157] flume, which would tend to increase the accu-

racy of the flume if it was not operating correctly, because there is a longer portion of the converging sides, which would tend to make the flow more uniform than if the entrance was shorter.

At the lower left hand side of the drawing appears the word "Venturi weir," and this refers to what is really a Parshall measuring flume, or what has sometimes been referred to as improved Vent*ru*i flume.

(1920) I don't believe it would be practicable or feasible to place the flume in a direct line of the discharge of water as it emerges from the opening of the tunnel in order to eliminate the right angle turn. Photographs one and two plainly indicate what would happen. The high velocity as it emerges from the Tunnel would cause the water to flow through the flume in a very turbulent condition. There would not be opportunity given to the water to reach a uniform flow and that is mainly true on account of the short distance from the portal of the flume to the point where the mountain side breaks off. It would not be possible to install the flume any great distance directly in front of the portal, and conditions in the flume would be largely as indicated in photographs numbers 1 and 2 of Defendant's Exhibit W-2. I think that the right angle turn is a necessity at this point to aid in dissipating the high velocity of the water as it emerges from the Tunnel.

(1921) In my opinion taking into consideration the physical conditions that exist at the outlet of the tunnel there, and shape and direction and position of the channel leading to the flume, I would say that the Parshall flume is the best measuring device that could be made use of under the physical conditions there existing. I know of no other device that would be better——

[fol. 1158] Defendant's Exhibit X-2 is a photograph of the Skyline rectangular rating flume looking down stream. I took it on June 10th of this year (1933), at the time that Mr. Potts was measuring the flow of the water through the flume. It shows the flume and the shelter for the automatic register on the left bank. The (1922) stilling well is under this shelter.

This photograph correctly portrays the physical conditions that existed at that time.

(Defendant's Exhibit X-2 is offered in evidence.)

(Defendant's Exhibit Y-2 is marked for identification and are here copied.)

This exhibit is a photograph of the concrete flume which is installed on the Sand Creek Ditch. The photograph was taken looking down stream, by me on June 10th, at the time Mr. Potts was making meter measurements. The shelter house, with the automatic register, is shown on the left of the flume, it being mounted on the top of the concrete stilling well, which is visible in the picture immediately above Mr. Pott's head.

I think that this photograph shows plainly the smooth condition of the flow of the water through the flume. Ordinarily it is very desirable to have a staff gage in the stilling [fol. 1159] well and I know of no other device that would be as good.

I think this drawing portrays to a reasonable degree at any rate the ground covered in the pictures which have heretofore been introduced in evidence and concerning which I have testified.

(Defendant's Exhibit X-2 marked for identification.)

Exhibit X-2 omitted. Printed side page. 3148 post.

[fol. 1166] Exhibit Y-2 omitted. Printed side page. 3149 post.

[fol. 1161] (1923) But at this particular installation I do not believe that there is a staff gage in the stilling well, but instead it is located on the left hand wall of the flume looking down stream and the smooth condition of the flow of the water through the flume is indicated by this photograph. This photograph was taken on June 11th, 1933, instead of June 10, 1933, as I previously testified.

(Defendant offers in evidence Exhibit Y-2.)

By comparing Defendant's Exhibit W-2, and particularly the photographs of that exhibit which shows the Parshall flume at the outlet of the Laramie-Poudre Tunnel, with Defendant's Exhibit X-2 and Y-2, it may readily be noted that with the rectangular flume the water flows through the flume at about the same velocity as it does through the ditch leading to the flume; while the flow of the water through the Parshall flume (1924) is much different, wherein the velocity

is materially increased, and the water is accelerated in such a fashion as to iron out any irregularity which might have been occasioned by conditions above the flume. This also tends to keep the control point, or throat of the flume free from any gravel or other debris.

Defendant's Exhibit V-2 is a drawing of the Skyline flume, and I think that it correctly portrays the physical facts as shown in the picture which has been introduced in evidence. However, I cannot say as to the dimensions shown in the drawing, because I did not measure all the features of the flume for which dimensions are given on this picture. I would say this is a very good representation of the Skyline flume.

Defendant's Exhibit G-2 I think correctly portrays in general the physical facts, showing the Sand Creek flume as [fol. 1162] it is installed, and as shown by the picture in Defendant's Exhibit Y-2.

I presume the dots shown on the bottom of the flume represent sand deposits.

(1925) Defendant's Exhibit T-1 is a rating curve for the Parshall six-foot flume that is installed at the Laramie-Poudre Tunnel. It is identical with Defendant's Exhibit E-1, except that two additional points have been plotted upon the curve to represent the meter measurements made by Mr. Potts and Mr. McGraw on June 10th, 1933, of the flow of the water at the outlet of the Poudre Tunnel. The two additional points are numbered on the exhibit as 25 and 26. The Potts measurement is indicated by Serial Number 25. The McGraw measurement is indicated by Serial Number 26. The balance of the 24 points which appear on the exhibit are identical with the points bearing the same number on Defendant's Exhibit E-1.

On Defendant's Exhibit E-1 the date of the measurement number 22 appears in the table on the right hand side of the Exhibit as 8-5-32, indicating August 5, 1932. That date should appear as 8-15-32, indicating August 15, 1932.

I think that Defendant's Exhibit T-1 plainly indicates that (1926) the Parshall flume at the outlet of the Poudre Tunnel is correctly measuring the flow of the water through the tunnel and has done so since its installation, bearing in mind that it has been shown that the meter measurements that were made, results of which are shown on the exhibit as points 12, 18, 19 and 21, were made under adverse

conditions; but even assuming that the flume was not operating correctly at the time those points were made, I think the exhibit would still show that the flume, during the major portion of that period, has correctly measured the flow of [fol. 1163] the water. Points 18, 19 and 21 indicate measurements that were made on July 5, 1932.

On June 18, 1932, a measurement was made by Mr. McGraw and is shown on the Exhibit as number 23. It may be noted from the exhibit that that point falls exactly on the curve, and that at that time the flume was operating correctly. On July 10th, five days after the measurements of July 5, 1932, were made a measurement was made by Mr. Parshall, as indicated on the Exhibit T-1 as point 20. The point falls very close to the line of the curve, and on August 15th, the next month after the July 5th measurements were made, Mr. Burgess measured the flow of the water through the flume. The results of his measurements are shown by point 22 on the curve and it will be noted that this point falls very close to the curve.

(1927) With respect to the meaning of the phrase "theoretical curve", which has appeared in my testimony and testimony of other engineers, its meaning may be indicated by the following explanation. When meter measurements are made, the results of those measurements are plotted upon the graph; that is the particular gage height which obtained at the time the measurements were made is indicated on the graph by the vertical distance that particular point is above the bottom of the graph. The discharge at the time the meter measurement was made is indicated on the graph by the distance that the point is to the right of the left hand edge of the graph. Now the closeness with which those points plot with respect to the theoretical curve at the particular stage pertaining at the time the measurement was made, is an indication of the accuracy with which the flume was measuring the water, assuming that the meter measurements were accurate. In preparing a curve for a [fol. 1164] rectangular flume, as reverse process is carried out. First, discharge measurements are made by current meter. The results of those measurements are plotted on cross section paper, such as appear on Defendant's Exhibit T-1, and a curve is drawn through those points to average them.

The rating curve shown on defendant's Exhibit T-1 is in my opinion an excellent curve.

E. B. House recalled:

Direct examination.

By Mr. Shrader P. Howell:

(1928) I am familiar with the classification provided by the United States Geological Survey in classifying various records relating to water. (1929) The Geological Survey classifies as excellent any record where the error is considered to be less than 5%. They classified as good records of ditches where the error is considered less than 10%; they classified records of ditches as fair where the error is considered to be less than 15%, and they classified records of ditches as poor where the error is considered to be more than 20%. In view of these classifications of the United States Geological Survey, I would classify the records of the transmountain diversions by the Laramie-Poudre Tunnel as excellent. I would classify the record of the transmountain diversion by the Skyline Ditch as excellent, and I would classify the records of the Sand Creek or Wilson Supply System as excellent.

Cross-examination.

By Mr. James A. Greenwood:

(1930) The Laramie-Poudre Tunnel is merely a segment or unit of the diversion system of the Laramie-Poudre Company, taking water from the Laramie watershed and delivering it into the Cache la Poudre River.

[fol. 1165] R. J. Tipton, witness in behalf of defendant, recalled.

By Mr. Shrader P. Howell:

(1930) Defendant's Exhibit H-2, is a rating table prepared for the Sand Creek Ditch rating flume by Mr. Stimson, who has already testified. The gage height of the Sand Creek flume (1931) during the time Mr. Potts made his measurement on June 11th, was 2.96 feet and the discharge as determined by Mr. Potts at that stage was 127.18 cubic feet per second. The rating table as shown on Defendant's

Exhibit H-2 shows that with a gage height of 2.9 feet the discharge is 118 ft., and with a gage height of 3, the discharge is 126 feet. When the proper interpolation is made, the table would indicate that if the gage height is 2.96, which was the gage height at the time Mr. Potts made his measurement the discharge would be 122.8 second feet which is a difference of 4.4 second feet between that and Mr. Pott's results or a difference of slightly over 3%. Mr. McGraw measured the flow after the measurement of Mr. Potts wa made. The mean gage height during Mr. McGraw's measurement was 3.08 feet, and the discharge as determined by Mr. McGraw was 137.62 feet. Mr. Stimson's table shows when the proper interpolation is made that with a gage [fol. 1166] height of 3.08 feet, the discharge would be 134 feet or 3.6 second feet less than the results obtained by Mr. McGraw, or a difference of about 2.7%.

(1932) I think the Sand Creek Ditch, Skyline Ditch and Sand Creek rating flume and the automatic recording devices are entirely adequate to serve their purpose if properly maintained, and providing sufficient meter measurements are made to determine that conditions have not changed to the extent that the rating tables have become obsolete.

As to the Skyline flume, I think that more frequent measurements would be necessary to determine that than on the Sand Creek flume, because all indications are that conditions at the Skyline flume have changed somewhat, which requires a new rating table.

I have examined all the automatic register charts pertaining to the Sand Creek Ditch, the Skyline Ditch and the Laramie-Poudre Tunnel in detail for the purpose of using those charts to compute the *the* amount of water diverted by those ditches. In my opinion, in general, the charts are sufficiently complete and accurate for the determination of the discharge of the diversions from the Laramie River. I, of course, found some omissions on the charts as far as the notations of the gage reader are concerned and some discrepancies on the charts, but those omissions were not any more frequent than I have found on most any series of charts of that class. In (1933) general, the charts covering all of these diversions could be readily interpreted, and reliance could be placed upon them due to notations on the charts by Mr. McAnelly, who visited the diversions, or due to notations by the gage reader.

[fol. 1167] I have examined in detail Complainant's Exhibit 66 to 71, inclusive, which were the automatic charts of the Sand Creek Ditch for the years 1923 to 1928, inclusive, which have heretofore been introduced in evidence. I found many omissions of notations that should have been placed upon the charts by the gage reader. However, with one or two exceptions I had no hesitancy at all in using the charts.

Referring further to Complainant's Exhibit 66, which comprises nine charts from the automatic register on the Sand Creek ditch, covering the year 1923, I found no staff gage notations as made by the gage reader for any of the charts. However, I find that when the first chart was removed the pen showed a gage height of 1.58. The second chart that was placed showed a gage height of 1.58 second when the second chart was removed the pen showed a gage height of 2.75 and when the next chart was placed the pen showed a gage height of 2.75 and when the chart was taken off the pen stood at a gage height of 2.38.

(1934) When the next chart was placed on, the pen showed a gage height of 2.35 or .03 of a foot difference between the off of the previous chart and the on of that chart. That chart was taken off on June 15th, and the pen showed a gage height of 1.85, and when the next chart was placed on, on June 15th, the pen showed a gage height of 1.85, an exact check, and on the 22nd of June when that chart was removed, the pen showed a gage height of 1.85, and the next chart at the beginning showed a gage height of 1.81, a difference of .04 of a foot. That chart was removed on June 28th, and at the time it was removed the pen stood at a gage height of 1.35. The next chart was placed at a gage height of 1.04 and a notation which cannot be read, referred to some error in the setting. Upon July 2nd, that chart was removed and the gage height was 1 foot. The next chart was placed with [fol. 1168] the pen set at a gage height of .98 of a foot, or .02 difference. That chart was removed on July 5 and indicated a gage height of the pen at .5 of a foot, and the next chart was placed on at the same time with the pen showing a gage height of .48 or a foot or a difference of .02. That was the last chart, and it was removed on July 8th, with the pen indicating a gage height of .5, and then it dropped down rapidly, showing that the water was turned out.

Now, in looking through the charts and examining the record as drawn with the pen, there are no irregularities

found, except one place where the clock stopped between May 26th and June 1st. The charts in general comprise a good continuous record, and assuming that the gage reader visited the device at least three times a week to phone his reports to Mr. McAnelly, I cannot see anything that would preclude the use of those charts to determine the diversion by Sand (1935) Creek for the year 1923.

Referring to Complainant's Exhibit 67, which comprises two charts from the Sand Creek Ditch for the year 1924, I find staff gage notations by the gage reader of 2.75. I find that the chart was set at 1.78, which is an obvious error of 1 foot, made by the gage reader in entering the staff gage notation. I found shortly after the chart was installed on the same day that the device was tested two different times, and I found on the next day it was tested indicating that the gage reader had visited the device and had no doubt determined by this testing that it was operating correctly. The chart ends with an indicated gage height of the pen of 1.6, and the next chart was installed with the pen indicating the gage height of 1.6. The gage reader had noted a staff gage reading 1.6. The gage reader has noted a staff gage read-
[fol. 1169] ing of 1.1, an obvious error in reading the first interval above the .5 point, as .1 instead of 1.6. The record ends on June 3rd, with a gage height indicated by the pen of 1.7. This series of two charts could not be classed as good and would hardly be classed as poor on account of the doubt which might exist as to what the actual gage reading was, but due to the fact that there is a difference of one foot, it was assumed that the gage reader made a very common error of one foot, and that if the water had been administered improperly, there would have been some objection on the part of the owners of the ditch.

Turning to Complainant's Exhibit 68, which comprises seven charts from the Sand Creek Ditch, for the year 1925, I find that there have been several staff gage notations entered by the gage reader on several of the charts and during that period Mr. (1936) McAnnelly visited the diversion and made a notation. The first chart was placed on the register on May 5th, and was taken off with a gage height of .72 of a foot. The next chart was placed on a gage height as indicated by the pen as .73 of a foot, or a practical check. During the time the chart was on the register, between May 12th and May 19th, Mr. McAnelly visited the device on

May 16th, and tested the pen and made the notation which reads "May 16th, 1925, Mc. .5 off," and the chart was reset. That indicates that there was a slippage during that period, and that the record should be corrected back to that point to take care of that .5 error.

The chart was taken off on May 19, when the pen indicated a gage height of 1.6. *The gage reader had entered a staff* [fol. 1170] notation of 1.6, which checked with what the pen shows. The next chart was installed with the pen set at 1.6, and the staff gage notation by the gage reader shows 1.6. That chart was removed on May 25th, with the pen showing a gage height of 2.0, and the next chart was put on with the pen showing a gage height of 2.0, that checked with the previous chart, and a staff gage notation by the tender of 2.0. That chart was taken off on June 1st, and the pen showed a gage height of 1.82 feet, and the gage tender had made a notation that the gage height was 1.8, which was a practical check. The next chart was placed on June 8th, with gage height (1937) as shown by the pen of 1.82. When it was removed, the pen showed a gage height of 1.45, and the next chart was placed on with the pen showing a gage height of 1.43, a difference of .02 of a foot, which is a very small difference. That chart was removed with the pen showing a gage height of 1.15. The next chart was placed with the pen showing a gage height of 1.13, or .02 difference between the ending of one chart and beginning of the other, which is a very small difference. That chart was removed on June 21st, with a gage height indicated of .85 of a foot. Although in this series of charts there were many omissions of notations that should have been entered by the gage reader, yet the charts show a good continuous record, with no apparent irregularities, except when Mr. McAnelly found an error of .5 of a foot and corrected it. I have no hesitancy in using these charts to determine the discharge by Sand Creek for the year 1925.

The next series of charts, which is Complainant's Exhibit 69, comprises three charts covering the diversion by Sand Creek for the year 1926. I found three staff gage readings by the tender, and in two instances the staff gage [fol. 1171] readings varies from the pen setting by .1 of a foot, the same sort of an error as the one foot error I noticed in one of the other series of the charts. The first chart was installed on May 18th, removed on May 23rd,

with the pen showing a gage height of 2.55. The tender had indicated a gage height of 2.6½. The next chart was installed with the pen showing a gage height of 2.53, and the gage tender again carries his error forward and entered a staff gage reading of 2.6½. This chart was removed on May 30th with an indicated gage height of the pen of 2.15. During the week (1938) covered by this chart an adjustment had been made in the setting of the pen on the 29th with the notation "Saturday P. M. .2 low." The chart indicates that on May 24th, the float was stuck, probably due to ice conditions, and was suddenly released after a period of some eight or nine hours, and that sudden release of the float no doubt caused a slippage of the cable, which made it necessary to make the .2 adjustment, as indicated on the 29th, so that .2 error was taken into consideration and the chart was corrected back to the 24th, where the apparent slippage occurred. The next chart was placed on May 30th, with the gage height shown by the pen of 2.12, as computed with the gage height of 2.15, as shown by the previous chart. Then, at 10 A. M., a notation on the chart indicates a gage height of 2.9. I think that that is considered by Mr. Meeker as a gross error. In studying the chart I could not concur in that opinion. The chart indicates that it was placed at 9 A. M. with the pen set at 2.12, which is almost exactly the same gage height as indicated by the pen on the prior chart at its re- [fol. 1172] moval. The chart indicates that within that hour the water rose quite rapidly and suddenly in the canal, and at ten o'clock there was a testing of the pen, after the pen had reached a gage height of 2.9, and the chart indicates that the staff gage reading was 2.9 at ten o'clock A. M., which is exactly what the chart shows. As to why a notation was not made at the time the chart was placed, I do not know. The chart indicates there was a sudden rush of water which might have been due to a cloudburst and the device was probably left by (1939) the gage reader in order that he might look after the ditch, clear away the debris and so forth, and when he came back he placed the proper notation on the chart at the proper time. The chart indicated that the pen was recording the true gage height at the time the gage tender made the notation on the chart.

The next series of charts, that comprise Complainant's Exhibit 70, for the year 1927, for the Sand Creek diversion, I find for the entire period covered by nine charts that there is a continuous and good record made by the pen, although there were no staff gage notations made by the tender. On May 24th, which was the time embraced by the first chart, I found that Mr. McAnelly tested the pen and made the notation "O. K. 5/24/27 McA.", which fixes conditions as of that time and indicates that the device was operating correctly and that the pen was set to correspond with the staff gage. From that time on the greatest error that occurs in the setting of one chart, as compared with the chart preceding it, is .05 of a foot, and that error applies to only one chart. There is another error of .03 of a foot, which is very small and another error of .02, which is also small. I saw no reason at all why these charts could not be used to determine the true discharge within practical limits of accuracy, as made by the Sand Creek diversion in the year [fol. 1173] 1927. There is one other exhibit in this series which covers the year 1928, and is marked Complainant's Exhibit 71, and comprises three charts from Sand Creek. The first chart, was placed on May 10th, and removed on May 17th, with gage height, as shown by the pen of .93 of a foot. The next (1940) chart was placed with the pen indicating a gage height of .95 of a foot, or a difference of .02 of a foot, which is very small.

That chart was removed on May 24th, with an indicated gage height of the pen at 2.10 feet. The next chart was installed on the same day with the pen indicating a gage height of 2.10, an exact check. The chart was removed on May 27th at the end of the run. Although there are no staff gage notations whatsoever on that series of charts, yet there is a perfect continuous record made with the pen. Assuming the first chart was set properly, I can see no reason why this series of charts cannot be used to determine the discharge of Sand Creek for the year 1928, as being within (1941) reasonable limits of accuracy.

I have indicated that to my mind in general the record as made by the automatic register during the years in question, was a good continuous record. There were some defects that were hard to interpret, but in general where two interpretations could be placed upon a particular chart, the error that would enter into a computation, would be very

small, regardless of which interpretation was placed upon the chart.

Mr. Meeker has used charts in the present hearing which have the same defect, and has used them for the purpose of drawing conclusions as to the diversions. For instance during the year 1926, from June 6th to 26th, there were some diversions made by the Skyline Canal, which were not reported by Mr. McAnelly, due to the fact that there was free water in the river. However, those diversions were [fol. 1174] shown by the charts that were maintained on the automatic recording device at the Skyline rating flume during that period. In order to determine the amount of those diversions that were unreported by Mr. McAnelly, Mr. Meeker used those charts, although there is not a single one of the charts that has a staff gage notation made by the gage tender, and for that whole year none of the charts have such notation.

Now in computing the discharge of the various trans-mountain diversions from the Laramie River it has been necessary to examine other records in the State Engineer's office, such as the rating tables that were prepared for the various trans-mountain diversions to determine whether (1942) there had been a sufficient number of ratings made to prepare a proper rating table, and also whether there had been a sufficient number of measurements made after that time to determine whether there had been any change made in the rating table.

I found that numerous measurements had been made to prepare rating tables and that several rating tables had been prepared and used, and although one would vary very little from the other, yet for the period, the one making the ratings seem to think that a new table was justified. I think there was no question but what on the Skyline a sufficient number of ratings have been made to prepare the proper rating tables and sufficient number of tables have been prepared for the time under consideration to accurately determine the flow of water through the Skyline Ditch.

As to the Sand Creek diversion, I found one rating table made in 1922, which covered the period, and found no other (1943) table or records of any other measurements. Since my examination of that table, I found that measurements [fol. 1175] had been made each year by Mr. McAnelly to determine whether there had been a change and he deter-

mined that there had not been, and in view of the recent rating made by Mr. Stimson, which checked exactly with that made by Mr. McAnally in 1922, except that Mr. Stimson made some higher measurements, and was able to extend the rating table as prepared by Mr. McAnelly beyond the limits as used by Mr. McAnelly, I think that by using the 1922 rating table an accurate record of diversions can be determined.

As to the Laramie-Poudre Tunnel, of course, since 1927, the present flume, the Parshall flume, has been in operation at that point, and as I previously testified I think that that flume for that entire period has operated well within practical limits of accuracy. Prior to the installation of the Parshall flume in 1927, the record indicates that a concrete flume had been maintained at that point, and several rating tables had been prepared for that concrete flume at intervals, and I have no reason to question the tables that were prepared for that device. I used those tables for working up the record, which of course applied to the year 1926 only, since there were no charts prior to that year.

I computed the discharge of the various trans-mountain diversions in the Laramie River from the records in the State Engineer's office for the years 1922 to 1932.

(1944) In making these computations I examined the charts on file in the State Engineer's office covering the diversions. I sorted out the charts on which discrepancies occurred and made an interpretation of those discrepancies, and determined the gage heights by means of a planimeter, which eliminated to a large extent the personal element. [fol. 1176] After the gage heights were determined the discharge was determined by comparing the gage heights with the standard rating table that was in force for the particular period covered by the charts. In some instances I found that the automatic register was not placed in operation in the early spring at the time the water started and that here were some records of diversions made by Water Commissioner McAnelly, that were not covered by the charts and in those instances I supplied the missing data from the Water Commissioner's reports. I found no charts at all for the year 1922, and for that year I used the Water Commissioner's reports. There were no charts for the Laramie-Poudre Tunnel prior to 1926, and for all of the years prior to that time I used the Water Commissioner's

reports and felt justified in doing so in that the records, as determined by the charts, checked very closely with the Water Commissioner's reports when those two reports were concurrent.

(Defendant's Exhibit Z-2 is marked for identification.)

[fol. 1177] (1945) Defendant's Exhibit Z-2 is a record of the daily gage heights in feet, and the discharge of the Laramie-Poudre Tunnel at the rating flume for the years 1922 to 1932, inclusive, and consists of eleven sheets, one sheet covers each one of the years in question. The first year's record, as shown on the first year of the sheet for the year 1922, is taken from the Water Commissioner's reports. On the right side of the Exhibit appears the names of the parties computing the discharges under my supervision. Each sheet is divided into months, indicated by columns, and each month into days, and in one of the columns appear various values during the period that the diversion was made. These values indicate the discharge in second feet for each of the days covered and at the bottom of the exhibit appears the word "total," and the figures opposite the word "total" indicate the total second feet during the month in the particular column in which the total appears. Under the total second feet appears another total, indicated by the notation "run-off in acre feet", which gives the total diversions in acre feet for the particular month in question. Under each month, in addition to the column indicating discharge is another column indicating gage height. For the first four sheets (1946) of the exhibit, covering the years 1922 to 1925, there are no gage height entries, because as I just testified, the records covered by these sheets were taken from the Water Commissioner's reports. For the balance of the sheets, covering the years 1926 to 1932, inclusive, the gage height values are entered in the proper places, and they indicate the gage height as determined by the automatic register charts.

(This Exhibit Z-2 was offered in evidence.)

(Defendant's Exhibit A-3, marked for identification.)

[fol. 1178] Defendant's Exhibit A-3 consists of ten sheets, which show the daily gage height in feet and the discharge

in second feet by the Skyline Ditch for the years 1923 to 1932, inclusive. The same notations which appear on Defendant's Exhibit Z-2 apply also to this exhibit. However, the full time is covered by this Exhibit, with one or two minor exceptions, and is covered by automatic register charts. Where Water Commissioners' reports were used, a proper note was made and proper notation was made on the left of the Exhibit.

(Defendant's Exhibit A-3 offered in evidence.)

(Defendant's Exhibit B-3 marked for identification.)

[fol. 1179] (1947) Defendant's Exhibit B-3, consisting of ten sheets is a record of the daily gage heights in feet and the discharge in second feet, of the Sand Creek Ditch for the years 1923 to 1932, there being a sheet for each of the years covered. The notations which appear upon Defendant's Exhibit B-3 have the same significance as the notations appearing upon Defendant's Exhibit Z-2. In general, all of the records shown upon this exhibit are taken from the automatic register charts; the exceptions are noted with the proper note on the left of the exhibit. These exhibits were prepared under my direction.

(Defendant's Exhibit C-3 offered in evidence.)

(Defendant's Exhibit C-3 marked for identification.)

[fol. 1180] Defendant's Exhibit C-3, consisting of seven sheets, is the record of the daily gage height in feet, and the discharge in second feet, of the Lost Lakes outlet for the (1948) years 1923, 1926, 1927, 1928, 1929, 1930 and 1931. The records as shown on the exhibit, were all taken and computed from the automatic charts on file in the office of the State Engineer. The notations which appear upon Defendant's Exhibit. C-3 have the same significance as those which appear upon Defendant's Exhibit Z-2.

(Defendant's Exhibit C-3 offered in evidence.)

Defendant's Exhibit T-1 which has heretofore been identified by Mr. Hinderlider, and also by this witness offered in evidence.

(Defendant's Exhibit D-3 marked for identification.)

[fol. 1181] Defendant's Exhibit D-3 omitted. Printed side page 3188 post.

[fol. 1182] Defendant's Exhibit D-3 is a summary of the Laramie-Poudre Tunnel discharge for the years 1922 to 1932, as compiled from the automatic charts and the Water Commissioner's reports. The information for this exhibit was taken from Defendant's Exhibit Z-2. The exhibit shows each one of the years from 1922 to 1932, and shows the months of the year from March to December, and indicates the diversion in acre feet that was made by the Laramie-Poudre Tunnel in those months. The last column indicates the total for each month and for the whole period and averages for each month in acre feet, and an average for the whole period.

(1949) This exhibit was prepared under my direction.

(Defendant's Exhibit D-3 offered in evidence.)

As shown by the last column of Defendant's Exhibit D-3, the diversions made by the Laramie-Poudre Tunnel for the years indicated were as follows:

For the year 1922, 7,300 acre feet; 1933, 10,200 acre feet; 1924, 4,490 acre feet; 1925, 11,200 acre feet; 1926, 6,060 acre feet; 1927, 7,665 acre feet; 1928, 10,403 acre feet; 1929, 8,905 acre feet; 1930, 3,000 acre feet; 1931, 2,900 acre feet; 1932, 13,649 acre feet, or a mean for the 11-year period of 7,797 acre feet.

I also computed the discharge of the Laramie Poudre Tunnel from Mr. McAnelly's weekly reports, and compared the results with the automatic register charts where that was possible. There was no way to make a comparison prior to the year 1926. However, for the period 1926 to 1932, inclusive, Mr. McAnelly's reports indicated a mean diversion by the Laramie-Poudre Tunnel of 7,423 acre feet, while defendant's Exhibit D-3 for that period indicates a mean [fol. 1183] discharge of 7,512 acre feet, or a difference between the two of about 1%.

(Defendant's Exhibit E-3 marked for identification.)

[fol. 1184] Defendant's Exhibit E-3 omitted. Printed side page 3189 post.

[fol. 1185] (1950) Exhibit E-3 offered by defendant is a summary of the Skyline Ditch discharges for the years 1922 to 1932. The information from which the exhibit was prepared for the years 1923 to 1932 was taken from Defend-

ant's Exhibit A-3, and that for the year 1922 was taken from the weekly reports of the Water Commissioner.

Defendant's Exhibit E-3 is in same form as defendant's D-3, and the notations which appears on Defendant's Exhibit E-3 has the same significance as the notation appearing on Exhibit D-3.

(Defendant's Exhibit E-3 offered in evidence.)

The diversions as made by the Skyline Ditch for each of the years 1922 to 1932, inclusive as shown in the last column of Defendant's Exhibit E-3, are as follows:

The diversion for 1922 was 16,093 acre feet; 1923, 16,830 acre feet; 1924, 13,670 acre feet; 1925, 14,887 acre feet; 1926, 18,747 acre feet; 1927, 22,041 acre feet; 1928, 19,240 acre feet; 1929, 24,490 acre feet; 1930, 18,239 acre feet; 1931, 13,659 acre feet; 1932, 17,995 acre feet; with a mean for the whole period of 17,808 acre feet.

I computed the discharges of the Skyline Ditch also from Mr. McAnelly's weekly reports, so far as that could be done. A comparison could be made for the years 1923 to 1932 only, since there were no charts available for the year 1922. The mean of the diversions as computed from the charts for (1951) the years 1923 to 1932, and the mean of the diversions for the same period, as computed from Mr. McAnelly's reports check within about 3%. Some of that error was due to some unrecorded diversions by Mr. McAnelly of the Skyline Ditch.

(Defendant's Exhibit F-3 marked for identification.)

[fol. 1186] Defendant's Exhibit F-3 omitted. Printed side page 3190 post.

[fol. 1187] Defendant's Exhibit F-3 is a summary of the Sand Creek discharge for the years 1922 to 1932, inclusive. The information for the years 1923 to 1932 was taken from Defendant's Exhibit B-3, and that for the year 1922 was taken from the weekly Water Commssioner's reports. The general form of the Exhibit, and notations which appear upon same have the same significance as the notations which appear upon Defendant's Exhibit B-3. This exhibit was prepared under my direction.

(Defendant's Exhibit F-3 was offered in evidence.)

(1952) Diversions made by the Sand Creek Ditch for each of the years 1922 to 1932, inclusive, as shown in the last column of Defendant's Exhibit F-3, are as follows:

The diversions for the year 1922 are 3,210 acre feet; for 1923, 4,940 acre feet; for 1924, 1,773 acre feet; for 1925, 4,216 acre feet; for 1926, 2,576 acre feet; for 1927, 3,400 acre feet; for 1928, 1,295 acre feet; for 1929, 5,515 acre feet; for 1930, 2,830 acre feet; for 1931, 2,190 acre feet; for 1932, 4,995 acre feet; with a mean for the period 1922 to 1932 of 3,358 acre feet.

The records of the Sand Creek diversions which appear in that table at the top of page 240 of Complainant's Exhibit No. 42, which is entitled "Water Supply Paper, 469, United States Geological Survey", and Defendant's Exhibit F-3, form a continuous record of the discharge from Sand Creek Ditch from 1902 up to 1932, inclusive.

(Defendant's G-3 marked for identification.)

[fol. 1188] Defendant's Exhibit G-3 omitted. Printed side page 3191 post.

[fol. 1189] Defendant's Exhibit G-3 is a summary of the Lost Lakes outlet discharge for each of the years 1923 to 1932, inclusive. The information from which the exhibit was prepared (1953) was taken from Defendant's Exhibit C-3. The general form of the Exhibit is the same as Defendant's Exhibit E-3, and the notations which appear upon the exhibit have the same significance as the notations upon Defendant's Exhibit E-3. This Exhibit was prepared under my direction.

(Defendant's Exhibit G-3 offered in evidence.)

The diversions as made by the Lost Lakes outlet for each of the years 1922 to 1932, as shown by this Exhibit are as follows:

The diversions for 1923 are 634 acre feet; for 1924, zero; 1925, zero; 1926, 863 acre feet; 1927, 454 acre feet; 1928, 411 acre feet; 1929, 470 acre feet; 1930, 231 acre feet; 1931, 106 acre feet; 1932, zero, with a mean for the period 1923 to 1932 of 317 acre feet.

(Defendant's Exhibit H-3 marked for identification.)

[fol. 1190] Defendant's Exhibit H-3 omitted. Printed side page 3192 post.

[fol. 1191] Defendant's Exhibit H-3 is a summary of the Bob Creek diversions for each of the years 1922 to 1932, inclusive. The exhibit was prepared from the Water Commissioner's weekly reports and its general form is the same as defendant's Exhibit D-3, and the notations thereon have the same significance as the notations which appear on Defendant's Exhibit (1954) D-3. This exhibit was prepared under my direction.

(Defendant's Exhibit H-3 offered in evidence.)

This exhibit shows diversions made by the Bob Creek Ditch for each of the years 1922 to 1932, inclusive.

The diversion for 1922 was 508 acre feet; 1923, 1,095 acre feet; 1924, zero acre feet; 1925, 738 acre feet; 1926, zero acre feet; 1927, 1,028 acre feet; 1928, 526 acre feet; 1929, 1,143 acre feet; 1930, 631 acre feet; 1931, 633 acre feet; 1932, 822 acre feet; with a mean for the period of 1922 to 1932, inclusive, of 648 acre feet.

(Defendant's Exhibit I-3 marked for identification.)

[fol. 1192] Defendant's Exhibit I-3 omitted. Printed side page 3193 post.

[fol. 1193] This Exhibit I-3 is a summary of the Columbine Ditch for each of the years 1922 to 1932. The information which appears from the exhibit was derived from the weekly reports of the Water Commissioner for District No. 3. The form of the exhibit is the same as Defendant's Exhibit D-3, and the notations thereon have the same significance as the notations which appear upon Defendant's Exhibit D-3.

(Defendant's Exhibit I-3 offered in evidence.)

(1955) This exhibit shows the diversions made by the Columbine Ditch for each of the years 1922 to 1932, inclusive, as follows:

For the year 1922, 180 acre feet; 1923, 329 acre feet; 1924, zero acre feet; 1925, 257 acre feet; 1926, zero acre feet; 1927, 371 acre feet; 1928, 369 acre feet; 1929, 585 acre feet; 1930, 158 acre feet; 1931, 210 acre feet; 1932, 174 acre feet, with a mean for the period of 1922 to 1932 of 239 acre feet.

(Defendant's Exhibit J-3 marked for identification.)

[fol. 1194] Defendant's Exhibit J-3 omitted. Printed side page 3194 post.

[fol. 1195] Defendant's Exhibit J-3 is a summary of the total trans-mountain diversions from the Laramie River to the Cache la Poudre River for the years 1922 to 1932, both inclusive. The first column of the exhibit shows the year; the second column, the Skyline diversions; the third column, the Laramie Poudre diversions; the fourth column is the Lost Lakes outlet diversions; the fifth column, the Columbine Ditch diversions; the sixth column, the Bob Creek Ditch diversions; the seventh column, the Sand Creek Ditch diversions; the eighth column is a total of all the diversions for the years 1922 to 1932; the ninth column indicates the total of all diversions for each of the years, excluding the Sand Creek Ditch diversion; the tenth column indicates the per cent that the total diversions, excluding the Sand Creek (1956) diversions each year, is of 33,500 acre feet. At the bottom of the table appears the means for each of the diversions and mean for the total. This exhibit was prepared under my direction.

(Defendant's Exhibit J-3 offered in evidence.)

It will be noted that the diversions for the Laramie-Poudre Tunnel for the year 1926, as shown by Defendant's Exhibit D-3 are the same as shown on defendant's Exhibit J-3 for the year 1926, and my explanation of that is as follows:

Neither the Water Commissioner's reports nor the charts for the year 1926, cover the total diversions as made by the Laramie-Poudre Tunnel. There was a period from March 24, to May 5th, I think was the date when the chart started, when diversions were made and reported by the Tunnel Tender to the Superintendent of the Laramie-Poudre Tunnel, but apparently those reports were not made to the [fol. 1196] Water Commissioner. Those reports are shown on Defendant's Exhibit T, and for that period of time that was not covered by the charts, or by Mr. McAnelly's reports, the diversions *for* determined from Defendant's Exhibit T, and those diversions were added to the total of the diversions as shown on Exhibit D-3 for that year.

Referring to the records of the diversions for the Laramie-Poudre Tunnel for the year 1926, as shown by Defendant's Exhibit T, as compared with the discharge computed

(1957) from the automatic charts, the following facts appear:

The two records are concurrent for the period of May to September, inclusive, with the exception of two days in the forepart of May, as I computed them from the automatic charts, are 1,936 acre feet. Mr. Duvall's daily record as tunnel tender, indicates that the diversions for that period were 1,998 acre feet, a practical check. For June, my computations indicated that diversions totalled 764 acre feet. Mr. Duvall's report showed 718 acre feet, a very small difference. In July, my computations showed diversions of 1,340 acre feet and Mr. Duvall's showed 1,324 acre feet, a practical check. For August, my computation showed diversion of 1,030 acre feet, and Mr. Duvall's report showed 1,024 acre feet, a practical check; in September my computations showed a discharge of 990 acre feet. Mr. Duvall showed a diversion of 972 acre feet, a practical check; the total from May to September, inclusive, as computed by me, was 6,060 acre feet. The total for the same period, as shown by Mr. Duvall's reports, is 6,036 acre feet, which is a difference of about ½%.

(1958) Column 8 of Defendant's Exhibit J-3 indicates a [fol. 1197] total diversion made from the Laramie River and from Sand Creek to the Poudre, for the years 1922 to 1932, inclusive as follows:

For 1922, 27,291 acre feet; 1923, 34,028 acre feet; 1924, 19,933 acre feet; 1925, 31,298 acre feet; 1926, 29,311 acre feet; 1927, 34,959 acre feet; 1928, 32,244 acre feet; 1929, 41,108 acre feet; 1930, 25,089 acre feet; 1931, 19,698 acre feet; 1932, 37,635 acre feet, with a mean for the period of 1922 to 1932 of 30,236 acre feet.

In column 9 of Defendant's Exhibit J-3, will be found the total of all diversions from the Laramie River to the Cache la Poudre, excluding the Sand Creek diversions for the years 1922 to 1932, inclusive, which are as follows:

For 1922, 24,081 acre feet; 1923, 29,088 acre feet; 1924, 18,160 acre feet; 1925, 27,082 acre feet; 1926, 26,735 acre feet; 1927, 31,559 acre feet; 1928, 30,949 acre feet; 1929, 35,593 acre feet; 1930, 22,259 acre feet; 1931, 17,508 acre feet; 1932, 32,640 acre feet, with a mean for the period of 1922 to 1932 of 26,878 acre feet.

(1959) (Defendant's Exhibit K-3 marked for identification.)

[fol. 1198] Defendant's Exhibit K-3, is meter notes of the measurements made of the flow through the Parshall flume installed at the Laramie-Poudre Tunnel outlet on June 23, 1933, by L. L. Burgess, who is Chief Hydrographer for the State Engineer's office of Colorado. The measurement, as made by Mr. Burgess on June 23, 1933, indicates that there was a mean gage height of 2.83 feet, and the discharge as measured by him was 124.32 second feet. There is a note at the bottom of the notes which says: "Sand, Gravel and Boulders Extend into Mouth of Flume."

(1960) Defendant's Exhibit T-1, which is the rating curve for the Parshall flume at the Laramie-Poudre Tunnel outlet indicates a gage height of 2.83, which Mr. Burgess found, the discharge would be 126 feet, as nearly as can be read from the curve. The measured discharge by Mr. Burgess was 124.32, so that point would plot almost exactly upon the curve and would be the highest point on the curve. This measurement is the highest that has been made of the flow of water through the flume by current meter. The exact amount of water flowing through the flume, as worked out by the formula developed by Mr. Parshall for this flume, would be 126.26, which is 1.94 second feet more than Mr. Burgess found. Mr. Burgess' measurement was 1.4% in variation with the theoretical discharge.

Complainant's Exhibit 56, which is a series of tables prepared by Mr. Parshall to apply to the various size flumes indicate on page 8 that the highest gage height given in the table is 2.5. It was previously testified that Defendant's Exhibit T-1 and Defendant's Exhibit E-1 were prepared from this table. The curve on Defendant's Exhibit T-1 and Defendant's Exhibit E-1 extends beyond the gage height of [fols. 1199 & 1200] 2.5, and that extension is made on the basis of the formula which is given at the top of page 8 of Complainant's Exhibit 56.

(1961) The calibrations made by Mr. Parshall of this type flume in the laboratory did not, apparently, extend beyond a stage of 2.5. However, these measurements that we have made of the flume in the field at the Laramie-Poudre Tunnel outlet confirm the formula of Mr. Parshall, as given on the top of page 8 of Complainant's Exhibit 56.

(Defendant's Exhibit K-3 offered in evidence.)

The means obtained by myself as compared with the means or average determined by Mr. Patterson, who has

heretofore testified regarding this same matter, are as follows:

Mr. Patterson's mean of all diversions for the period of 1922 to 1932, excluding Sand Creek, was 26,908 acre feet. The mean I obtained for the same period and for the same diversions, as shown by Defendant's Exhibit J-3 is 26,878 acre feet. In checking Mr. Patterson's figures I find a very close conformity with my figures, for the major diversions. However, there are some differences between the values in some of the minor diversions.

My computations were entirely independent from those made by Mr. Patterson.

(Defendant's Exhibit 1, is by stipulation known and (1962) referred to as Defendant's Exhibit A, and same is marked for identification.)

Defendant's Exhibit 1 omitted. Printed side page 2673 post.

[fol. 1201] Defendant's Exhibit L-3 omitted. Printed side page 3196 post.

[fol. 1202] Defendant's Exhibit A is a photostatic copy of page 240 of the United States Geological Survey, Water Supply Paper 469, which water supply paper has heretofore been introduced as Complainant's Exhibit 42.

There is a table at the top of the page entitled "Annual Diversions from Laramie River Basin, 1899 to 1921, in Acre Feet." The first column in the table refers to the years 1899 to 1921, inclusive. The second column gives the Skyline Ditch diversions in acre feet for each of the years, with the mean at the bottom. The third column gives the Sand Creek System diversions, in acre feet, from 1902 to 1921, with the mean at the bottom. The fourth column gives the Laramie-Poudre Tunnel diversions from 1914, to 1921, inclusive, with the mean at the bottom and below the printed values are other values for the years 1922 to 1927, which, on the original, were apparently in pencil, in the hand-writing of Complainant's witness Meeker, obtained by him many years ago from the Division Engineer's records as testified by Meeker. The last column on the table gives the total diverted from the Laramie River for each of the years 1899 to 1921, with the mean at the bottom.

Defendant's Exhibit now marked "A" and which has heretofore been referred to as Defendant's Exhibit 1, in previous testimony, is the same exhibit which has been identified and referred to in the testimony of R. I. Meeker, who testified for the Complainant in this case.

(Defendant's Exhibit A offered in evidence.)

(Defendant's Exhibit L-3 marked for identification.)

[fol. 1203] Defendant's Exhibit L-3 is a photostatic copy of pages 955 and 956 of the printed record in the original case of Wyoming vs. Colorado. The exhibit consists of a table which shows the discharge of the Cache la Poudre River at the mouth of the Canon from April to October, inclusive and is labeled (1963) "Net Run-off Table—Acre Feet." The table is divided into several columns, the first column being the years 1884 to 1913, inclusive; the second column gives the run-off of the Cache la Poudre, apparently, for the period of April to October, for each of the years 1884 to 1913. The third column gives the Skyline diversions, for the period of those diversions. The fourth column gives the Sand Creek Ditch diversion from 1902 to 1913, inclusive. The next column gives the Grand River Ditch diversions for the period of 1903 to 1913. The next column gives the Michigan Ditch diversions for the period 1905 to 1913. The next column gives the North Poudre Canal diversion for the period 1899 to 1913, and the next column is headed "Net run-off at Canon", and gives the quantity of water flowing into the Poudre at the Canon for the period April to October, for each of the years 1884 to 1913, inclusive, after being corrected (1964) for trans-mountain diversions into the Basin, and diversions by the Poudre-Valley Ditch and the North Poudre Canal above the station. The last column is headed "Percent of normal," and gives the percent of the net run-off at the Canon for each year at the indicated mean which appears at the bottom of the table in the next to the last column.

(Defendant's L-3 offered in evidence and read as copied.)

(Defendant's Exhibit M-3 was marked for identification.)

[fol. 1204] Defendant's Exhibit M-3 omitted. Printed side page 3197 post.

[fol. 1205] Defendant's Exhibit M-3 is a summary of the Skyline Ditch diversions for the years 1899 to 1932. The first column of the table which appears on the Exhibit gives the years 1899 to 1932. The next and last column upon the exhibit gives diversions by the Skyline Ditch in acre feet for each of the years 1899 to 1932, inclusive. At the bottom of the table appear means for certain periods within the total period of the record. The values for the years 1899 to 1913, inclusive, are from Defendant's Exhibit L-3, which was Defendant's Exhibit 124 in the original Wyoming vs. Colorado case. The values for the years 1914 to 1921, inclusive, are from Defendant's Exhibit A, which formerly was Defendant's Exhibit 1.

The values for the year 1922 are from the weekly reports of the Water Commissioner in District No. 3. (1965) Those for the years 1923 to 1932, inclusive, are from Defendant's Exhibit E-3. This table was prepared under my supervision.

(Defendant's Exhibit M-3 offered in evidence.)

(Defendant's Exhibit N-3 marked for identification.)

[fol. 1206] Defendant's Exhibit N-3 omitted. Printed side page 3198 post.

[fol. 1207] This exhibit is a summary of the Laramie-Poudre Tunnel diversions for the years 1914 to 1932, both inclusive. The first column gives the diversions made by the Laramie-Poudre Tunnel for each of the years 1914 to 1932. At the bottom of the table appears means for certain periods within the total period. The values for the years 1914 to 1921, inclusive, are from Defendant's Exhibit "A" and the values for the years 1922 to 1932, inclusive, are from Defendant's Exhibit D-3. This table was prepared under my direction.

(Defendant's Exhibit N-3, offered in evidence.)

(Defendant's Exhibit O-3 marked for identification.)

[fol. 1208] Defendant's Exhibit O-3 omitted. Printed side page 3199 post.

[fol. 1209] This Exhibit O-3 is a summary of the Sand Creek Ditch diversions for the years 1902 to 1932, both inclusive. The (1966) values for the years 1902 to 1932, inclusive, are from Defendant's Exhibit L-3. Those for the years 1914 to 1921, inclusive, are from Defendant's Exhibit A. Those for the year 1922, are from the reports of Water Commissioner in District No. 3. The values for the years 1923, to 1932, inclusive, are from Defendant's Exhibit F-3.

(Defendant's Exhibit O-3 was offered in evidence.)

In my opinion if the Supreme Court Decree of 1922 in the case of Wyoming v. Colorado is interpreted to mean that the Skyline Ditch is limited to 18,000 acre feet diversion in any one year, the effect would be to tend to deprive the owners of the Skyline Ditch of some water that they enjoyed the use of prior to the filing of the former Wyoming vs. Colorado suit.

In order to explain how I arrived at my conclusions it will be necessary for me to refer to Defendant's Exhibit M-3, which indicates that the Skyline Ditch diverted the following amounts of water during each of the years 1899 to 1913, both inclusive, the record of which diversions was in evidence in the former Wyoming vs. Colorado suit.

Defendant's Exhibit M-3 shows that for the year 1899, (1967) diversions were made in the amount of 17,699 acre feet; in 1900, 18,657 acre feet; 1901, 23,805 acre feet; 1902, 22,124 acre feet; 1903, 26,114 acre feet; 1904, 23,434 acre feet; 1905, 13,291 acre feet; 1906, 16,693 acre feet; 1907, 15,024 acre feet; 1908, 17,958 acre feet; 1909, 12,725 acre feet; 1910, 16,435 acre feet; 1911, 19,085 acre feet; 1912, 20,986 acre feet; 1913, 14,639 acre feet; the mean diversions for the period 1899 to 1913, as indicated by Defendant's Exhibit M-3, was 18,578 acre feet, or in round numbers about 18,000 acre feet.

[fol. 1210] However, the Skyline Ditch diverted amounts in excess of 18,000 acre feet during seven years of the sixteen year period and diverted amounts in excess of 22,000 acre feet during four years of the period. The maximum amount diverted in any one of those years was 26,114 acre feet. During the balance of the sixteen year period the season diversions were sufficiently below 18,000 acre feet—due in some cases to lack of sufficient water supply, and, no doubt, in other cases, to lack of need in the Poudre Valley—

to bring the mean seasonal diversion for the period down to about 18,000 acre feet. If the diversions had been limited to 18,000 acre feet in any one season the mean diversion of the Skyline Ditch for the period 1899 to 1913, would have been about 16,700 acre feet, or an average of 1,880 acre feet less per year than it actually diverted, and an average of about 1300 acre feet per year less than 18,000 acre feet. (1968) Defendant's Exhibit M-3, indicates that the mean annual diversions of the Skyline Ditch for the period 1899 to 1932, inclusive, was 17,352 acre feet. If the Skyline had been limited to a diversion in any one year of 18,000 acre feet, its mean diversion for the period 1899 to 1932, would have been about 16,000 acre feet, or an average of about 1,300 acre feet per year less than it actually diverted, and 2,000 acre feet less per year than an average of 18,000 acre feet.

The mean annual diversions of the Skyline for the period 1914 to 1932, inclusive, since the closing of the testimony in the original Wyoming vs. Colorado suit, as indicated by Exhibit M-3 of Defendant, was 16,384 acre feet. If the Skyline ditch had had its maximum diversion in any year limited to 18,000 acre feet, then the mean annual diversion of the Skyline Ditch for the period 1914 to 1932, under those conditions would have been about 15,600 acre feet, or an [fol. 1211] average of about 2,400 acre feet per year less than average of 18,000 acre feet.

Since the entering of the decree of the United States Supreme Court in 1922, defendant's Exhibit M-3 indicates that the mean annual diversion of the Skyline Ditch was 17,808 acre feet. If the diversions by the Skyline (1969) Ditch had been limited to 18,000 acre feet in any one year, during the period of 1922 to 1932, the mean annual diversion would have been about 16,650 acre feet, or about 1,150 acre feet less than it actually diverted per year, and 1,350 acre feet less than a mean annual diversion of 18,000 acre feet. I do not believe that the Skyline Ditch can divert *of* an average of 18,000 acre feet per year through its present system. There are many years when the actual production of water from the drainage area lying above the Skyline Ditch is less than 18,000 acre feet per season. For example, the water production throughout the Rocky Mountain Region during the years 1913, 1919, 1925 and 1931 was very low. In 1913, the Skyline Canal diverted only 14,639 acre feet, which [illegible]

doubtedly was all of the water that was available for diversion, since the water supply in the Poudre Valley was short during that year and there was need for additional water. Also in the year 1919, only 14,400 acre feet were diverted by the Skyline, although there was a shortage in the Poudre Valley and in the year 1931, 13,659 acre feet were diverted by the Skyline which without question was all that was available for diversions that year. Other years of the same type could be cited. If the maximum diversions made by the Skyline in any one year were limited to 18,000 acre feet, the diversions for many years being below that amount, due to lack of water supply, the mean diversion by the Skyline [fol. 1212] would necessarily be below 18,000 acre feet per year.

(1970) In my opinion as an Engineer, based upon my familiarity with the conditions which exist in connection with this particular ditch, and the diversions generally in this Basin in Colorado, I think the Court undoubtedly intended that the Skyline Ditch should enjoy diversions equal to those made prior to the filing of the original Wyoming vs. Colorado suit. The Court recognized the Skyline Ditch as a senior user on the Laramie River, and in determining the water supply available for use by the Wyoming users and by the Laramie-Poudre Tunnel, found a quantity of water in the Laramie River at Woods, Wyoming, which in the opinion of the Court was "Susceptible by means of practical storage and conservation of being converted into a fairly constant and dependable flow of 170,000 acre feet per year, but not more." This 170,000 acre feet of water was after the Skyline diversions, as shown by Defendant's Exhibit M-3, had been made, and the meadow rights in the Laramie River Basin in Colorado had been satisfied. If the Skyline Ditch diversion prior to the former suit had been limited to 18,000 acre feet in any year, its diversions would not have aggregated the amount that they actually did, and would not have averaged 18,000 acre feet per year, and there would have been actually more water at Woods than 170,000 acre feet.

(1971) I do not believe it would be possible for the Skyline to divert 18,000 acre feet every year. However, if it could, I believe that such a diversion in an extremely low water year, such as 1931, would affect users below more adversely than the present operation of the Skyline Ditch which in-

volves high diversions in years of large water supply, and small diversions in years of low water supply, with an average over a series of years of 18,000 acre feet per year. [fol. 1213] From a practical standpoint in my opinion I do not think that the diversions by Lost Lakes encroaches upon the Water supply of the Wyoming water users. Lost Lakes were operating prior to the filing of the former suit and the water supply found by the courts in Woods, Wyoming, was the supply after the Lost Lakes diversions had been made. If the Lost Lakes had not been in operation, the water supply at Woods would have been greater by the amount of the Lost Lakes diversions.

If the diversions for the meadow lands in Colorado were limited to 4,250 acree feet per year, in my opinion it would mean the destruction of a large amount of the 4,250 acres of meadow land lying in the Laramie River Basin in Colorado, because it is absolutely impossible to irrigate one acre of meadow land by the diversion of one acre foot (1972) of water.

I do not believe it was the intent of the Supreme Court in its former decree that these meadow lands should be abandoned. The Court, in its opinion, recognized the irrigation of 4,250 acres of native hay meadows in the Laramie Valley in Colorado, and based upon testimony indicating that the consumptive use by those meadows was one acre foot per acre, the Court recognized the use by those meadows of 4,250 acre feet per year.

In arriving at the water supply at Woods, Wyoming, that use by the 4,250 acres of native hay meadow had been satisfied before the water arrived at Woods. There has been no increase in the acreage of the meadow land since the former suit, and therefore, there has been no increased depletion of the water supply at Woods since the filing of [fol. 1214] the former suit. From a practical standpoint, I believe the court intended that the meadow lands in Colorado should be adequately irrigated as they had been, so long as the consumption of water by those lands did not exceed 4,250 acre feet per year, which the testimony indicated to be the yearly consumption at the time of the hearing of the former suit.

The run-off of any stream varies from year to year between more or less wide limits, depending upon the location of the stream and the source of its water supply. The

portion (1973) of the run-off of the streams in the Rocky Mountain Region that results from melting of snow in the mountains does not vary between such wide limits as the portion of the run-off which results from rains or snow from the lower altitudes. Not only does the run-off of the stream vary from year to year, but at times it seems to occur in low and high cycles, one cycle embracing several years of high run-off, and another cycle embracing several years of low run-off. Such occurrences have been termed cycles, but it may be somewhat of a misnomer, since cycle infers periodicity or occurrence at somewhat regular intervals.

While many studies have been made, and many are being made at the present time to determine the underlying law which controls the variations in weather conditions and stream flow, to date no conclusions have been reached that can be relied upon to determine the frequency of occurrence of so-called high and low cycles of run-off. Neither can the duration of a cycle be determined, nor the severity of low cycle or probable quantity of water produced during the high cycle.

At times, a so-called low cycle of run-off during a certain period applies only to a particular section of the country, while other periods of low run-off will be more wide-[fol. 1215] spread and will be felt over a considerable portion of the country. Ordinarily two stream systems lying close together and deriving their water supply virtually from the same sources will have the same character of run-off over a period of years.

There is a close relation between the character of the run-off *and* the Cache la Poudre River Basin, and the run-off in (1974) the Laramie River Basin above Woods, Wyoming. The two streams rise opposite one another and derive their water supply virtually from the same source. A mathematical analysis to determine the relation between the run-offs of the two streams indicates a very close co-relation between the two. This does not mean that the co-relation is exact and that for every year of high flow in the Poudre there is a corresponding high flow on the Laramie River, but it means that over a period of years the variation of the run-off of the two streams on the average will

be very similar, and major periods of low or high run-off will be more or less concurrent in the two basins.

The run-off in the Rocky Mountain Region during the period of 1925 to 1932, inclusive, was very low and was well below what we ordinarily consider normal. Incidentally, the term "normal" is a varying quantity changing with each year of record and is based upon past experience. So when we consider that a period of low water supply is unusual and well below normal, we are necessarily basing it upon past experience. We have no assurance that such a supply of water might not be repeated with greater frequency than indicated by existing records, nor do we know on the other hand but what its occurrence might be more infrequent than is indicated by existing records. The same may be said of the occurrence of periods of high run-off. However, the period of 1925 to 1932, inclusive embraces [fol. 1216] two or three years of what our experience has led us to believe to have been years of very low run-
(1975) off. This period of low water supply was rather widespread and was felt throughout the Rocky Mountain Region. An authority at the Colorado Agricultural College estimated there was a one million dollar loss in the Poudre Valley, in 1925, due to the low production of sugar beets alone caused by the low water supply. Another authority estimated about three million dollars loss in the Poudre Valley that year due to the low production of all crops. In 1925 the production of all crops in the Arkansas Valley Basin also was below normal. The low water supply in 1925 in the Arkansas River Basin was one of the incentives for the making of surveys for a large trans-mountain diversion from the Colorado River Basin, and for the making of surveys for the construction of a large reservoir in the Arkansas River Basin. The water supply in the Rio Grande River Basin in the San Luis Valley also was short.

The year 1930 was a general drought year over most of the United States. Many cities and towns in the East were compelled to install emergency municipal water plants because their regular sources of supply were deficient. The drought was felt in the Rocky Mountain region in that year, but did not culminate until 1931, when one of the most severe droughts ever experienced occurred. In 1931, the production of crops in the Poudre Valley and the South Platte Valley was below normal. I personally knew of one irri-

gation system in the Arkansas River Basin which irrigates [fol. 1217] 56,000 acres whose water supply was so short in 1931 that the production of beets was only three tons per acre, when, ordinarily production averages from 12 to 14 tons per acre. Storage supply in the Cache la Poudre, South Platte and (1976) Arkansas River Basins were completely exhausted in 1931. The San Luis Valley covered by the Rio Grande experienced in 1931 one of the only years of almost total crop failure due to short water supply. The run-off in the Colorado River Basin in 1931 was the lowest of record covering a 40 or 50 year period. The 1,070,000 acre foot United States Bureau of Reclamation Pathfinder reservoir in Wyoming, the water from which is used to irrigate about 220,000 acres of land, was full in 1930, but went dry in 1931, the first time since its completion in 1910. To date, storage in the Pathfinder is still far below normal. The run-off during the year 1932 was below normal, although in some sections of the Rocky Mountain Region, the snowfall in 1932 was normal or slightly above, the run-off from that snow was well below normal due to much of the water going to partially bring the ground water back to normal, it having been materially depleted during the low year of 1931. The reserve water supply of Denver reached an unprecedented low in 1931 and 1932, and was virtually exhausted by the winter of 1932. Emergency construction to develop supplies from the Colorado River was being contemplated when heavy snows this spring relieved the situation.

I think Complainant's Exhibit 35, which shows the run-off of the Laramie River at Woods, Wyoming for the years 1911 to 1932, very clearly indicates the occurrence of the low period of run-off between 1925 and 1932. It may be noted from the table that the period from 1911 to 1932 is divided into two parts, 1911 to 1924, inclusive, and 1925 to [fol. 1218] 1932, inclusive. The mean run-off is determined for the period 1911 to 1924 and is indicated on the exhibit in column 3 to have (1977) been 168,000 acre feet. This mean for the partial period 1911 to 1924 of 168,000 acre feet is then used as a yard stick to measure the run-off of all the other years. The variation in percentage from this arbitrarily adopted standard is then determined and the cumulative variation is entered in the last column of the table year by year from 1911 to 1932, inclusive. Of

course at the year 1924, the cumulative variation becomes zero because the period 1911 to 1924 was used as the basis to determine the variation. From 1925 to 1932, the table indicates an accumulative deficiency for each of the years and a final indicated deficiency in 1932 of 128.4. This indicates that between 1925 and 1932 the total water supply was 128% of 168,000 acre feet less than it would have been had the run-off been of the same character as occurred during the period 1911 to 1924, and plainly indicates the effect of the low years of 1925, 1930, 1931 and 1932, which were all included in the period of 1925 to 1932.

It would be erroneous to assume that the mean run-off for the period 1925 to 1932, inclusive, of most any of the streams of the Rocky Mountain region represented what might be considered a normal water supply, since the inclusion within such a short period of time of two or three years of exceptionally low run-off unduly distorts the mean.

It could not properly be inferred from Complainant's Exhibit 35, that the large indicated deficiency of 128.4% occurring from 1925 to 1932, and based on the 1911 to 1924 mean, was due to excessive uses or unlawful uses, of the Laramie River water by Colorado appropriators.

(1978) There is no question but what some of the de- [fol. 1219] creased flow was due to increased uses by Colorado users, since the Laramie-Poudre Tunnel has gradually increased its diversions, but as yet those diversions have not reached the 15,500 acre feet allocated to the Tunnel by the Court. However, most of the deficient water supply as indicated since 1925, was due to natural causes which affected the run-off of several streams in the Rocky Mountain Region. Moreover if Complainant's Exhibit 35 had been intended to show the effect upon the water supply of Wyoming by Colorado users since the entering of the Supreme Court decree, no doubt the analysis of the water supply would have been based upon the period 1911 to 1922, inclusive, and the period 1923 to 1932, inclusive, which would have resulted in an indicated deficiency not so great as the one shown in the Exhibit. This is true because the run-off during the years 1923 to 1924 was well above normal, and the inclusion of those years in the period since the entering of the Supreme Court decree would have raised the indicated water supply during that period.

(Defendant's Exhibit P-3 marked for identification.)

[fol. 1220] Defendant's Exhibit P-3 omitted. Printed side page 3200 post.

[fol. 1221] (1979) This exhibit is the April to October annual discharge of the Cache la Poudre River at the mouth of the can-on for each of the years 1911 to 1932, inclusive, corrected for diversions around the stations, and for trans-mountain diversions. The first column of the table gives the years from 1911 to 1932; the second and third columns give the reported flow of the Cache la Poudre River at the can-on for each of the years 1911 to 1932, the values in column 2 being for the full year, and those in column 3 for the period April to October. Column 4 gives the total water diverted around the station each year by the Poudre Valley Ditch, the North Poudre Canal and the Fort Collins Water Works. Columns 5 and 6 give the recorded flow of the Poudre, plus the diversions around the station for the annual period, as shown in column 5, and for the April to October period, as shown by Column 6. Column 7 gives the total trans-mountain diversions to the Poudre from other sources. Columns 8 and 9 give the flow of the Poudre, corrected for trans-mountain diversions, and for diversions around the station, column 8 giving the annual values, and column 9 the April to October values. The values in columns 8 and 9 represent the actual true production of water, in the Cache la Poudre River Basin above the mou*n*t of the can-on. Column 10 gives the percent that each of the values for the April to October run-off was of the long time 1884 to 1932 mean, the values of which appear in column 9 of Defendant's Exhibit P-3 and is comparable with the values which appear in the next to the last column of Defendant's Exhibit L-3, or Defendant's Exhibit 124 in the former case. Defendant's Exhibit P-3 and Defendant's Exhibit L-3 give a continuous corrected record of the flow of the Poudre from 1884 up to 1932, inclusive. The bottom of the table which appears on Exhibit P-3 are the mean flows for vari-
[fol. 1222] ous lengths of time.

(1980) (Defendant's Exhibit P-3 offered in evidence.)

(Defendant's Exhibit Q-3 marked for identification.)

[fol. 1223] Defendant's Exhibit Q-3 omitted. Printed side page 3201 post.

[fol. 1224] This exhibit is an analysis of the flow of the Cache la Poudre River as it naturally occurred for the years 1911 to 1932, inclusive, based on the same methods of analysis used by Mr. Nelson in analyzing the flow of the Laramie River at Woods, Wyoming, as shown by Complainant's Exhibit 35.

Exhibit Q-3 is prepared in the same form as Complainant's Exhibit 35. The first column headed "Year" shows each of the years 1911 to 1932, inclusive. In the second column headed "Year of Period" are serial numbers of the year in the series extending from 1911 as year No. 1 to year 1932 as year No. 22. The next column headed "Mean run-off at Year," "acre feet," has two values entered in it, the first opposite year 1924, which indicates a mean run-off in the Cache la Poudre River Basin from 1911 to 1924, inclusive, of 330,036 acre feet. Opposite the year 1932 appears the quantity of 308,283 acre feet which represents the mean run-off of the Cache la Poudre River Basin for the full period 1911 to 1932, inclusive. In the fourth column of the table is entered the annual run-off of the Cache la Poudre River in acre feet corrected for diversions around the gaging station and the trans-mountain diversions for each of the years 1911 to 1932, inclusive.

(1981) Values appearing in this column were taken from column 8 of Defendant's Exhibit P-3. In the 5th column of the exhibit headed "Run-off Index Mean, 330,036," are entered the percent that each year's run-off was of the mean run-off for the years 1911 to 1924. In the last column appears the cumulative variation in percent from the mean run-off for the period 1911 to 1924, inclusive. This cumulative variation naturally reaches zero at 1924, because the [fol. 1225] period 1911 to 1924 was used as a measure.

Defendant's Exhibit Q-3 indicates that by using the mean run-off for the period 1911 to 1924, as a yard stick, the accumulative deficiency from 1925 to 1932 was 145.1%. This exhibit shows the accumulative deficiency of 145.1% in the Cache la Poudre River Basin since 1925, while Complainant's Exhibit 35 indicates an accumulated deficiency of 128.4% for the same period in the Laramie River Basin above Woods, Wyoming.

There was no change in the uses of the Cache la Poudre River above the gaging station between 1911 and 1932. The (1982) only use made of the Cache la Poudre River wat

above the gaging station is that of the meadow lands which are limited in extent, and I do not believe there has been any change in those uses since 1911, and even if there had been, the change would not have been extensive enough to have affected the flow of the stream. I have used the term indicated deficiency in the run-off in discussing Defendant's Exhibit Q-3, but I do not consider it a proper term. The method of analysis used in preparing the exhibit does not mean anything except to accentuate the low water supply which occurred during the period 1925 to 1932. The large variation in the mean from 1911 to 1924 of 145.1% is due entirely to natural causes.

(Defendant's Exhibit Q-3 is offered in evidence.)

(Defendant's Exhibit R-3 marked for identification.)

[fol. 1226] Defendant's Exhibit R-3 omitted. Printed side page. 3202 post.

[fol. 1227] This exhibit was prepared under my direction, and is an analysis of the flow of the Arkansas River at Canon City corrected for diversions around the gaging station. This exhibit is in exactly the same form as Complainant's Exhibit 35 and Defendant's Exhibit Q-3. The analysis was made in exactly the same manner as used by Mr. Nelson in analyzing the flow of the Laramie River at Woods. (1983) The Arkansas River is the next major stream system rising in the state of Colorado on the East side of the Rocky Mountains south of the South Platte system. The study of the river is based on the flow at Canon City, because since 1911, there has been no change in the use of the water above that point which would change the condition of the flow, except a slight addition to the flow by water brought into the basin through recently constructed transmountain diversions. The uses above Canon City on the Arkansas are very small, and are confined to about 40,000 acres. Based upon the analysis made by Mr. E. K. Nelson, who has testified for the complainant this exhibit shows the cumulative variation from the 1911 to 1924 mean to have been 159.3%. The large variation to which I have just referred was a result of natural causes.

(Defendant's Exhibit R-3 is offered in evidence.)

(Defendant's Exhibit S-3 marked for identification.)

[fol. 1228] Defendant's Exhibit S-3 omitted. Printed side page 3203 post.

[fol. 1229] (1984) This Exhibit S-3 was prepared by me, and is an analysis of the Rio Grande River at Del Norte for the period 1911 to 1932, using the same method as E. K. Nelson used and has heretofore testified in analyzing the flow of the Laramie River at Woods, as is shown on Exhibit 35. The form of the exhibit is exactly the same as Complainant's Exhibit 35 and Defendant's Exhibits Q-3 and R-3, except that the recorded run-off is corrected during the two periods 1911 to 1924 and 1925 to 1932 for storage above the gaging station, and the recorded flaws for the years 1929, 1930, 1931 and 1932 are corrected for diversions around the station which diversions were not made prior to 1929. The Rio Grande River rises in Colorado and flows south across the south boundary of the State and is one of the major streams of Colorado.

Defendant's Exhibit S-3 shows an accumulated deficiency at the end of 1932, based on the mean for the period 1911 to 1924, of 113.8% and that is due entirely to natural causes. (1985) The Laramie-Poudre Tunnel was not placed into operation until the year 1914, when a small quantity of water was diverted, and since that time the diversions by the Tunnel have ranged between various amounts, but in no year has the total diversion equalled 15,500 acre feet, the amount allocated to it by the Supreme Court decree. Since 1911, diversions also have been made through the Columbine and Bob Creek Ditches, but such diversions together with the tunnel diversions have not exceeded in any year the 15,500 acre feet. However, such diversions as made by the [fol. 1230] Columbine and Bob Creek Ditches, represent an increase use by the Colorado users within the period of 1911 to 1932, and such increase use would naturally reflect itself in a depletion of the flow of the Laramie at Woods Landing. I do not consider that such uses, or any other uses by Colorado users have encroached upon the amount of water that the Wyoming appropriators are entitled to, under the terms of the Court (1986) decree.

The Court found 170,000 acre feet of fairly constant supply at Woods, Wyoming after all prior users in Colorado, including those of the Meadow Lands and Skyline Canal diversions were satisfied and from that 170,000 acre feet the court allocated to the Tunnel 15,500 acre feet, which

would leave 154,500 acre feet at Woods for Wyoming users. By the term "Woods" I have reference to a gaging station on the Laramie River in Wyoming, which I believe is some 20 miles north of the Colorado-Wyoming State line in Wyoming.

(Defendant's Ex. T-3 marked for identification.)

[fol. 1231] Defendant's Exhibit T-3 omitted. Printed side page 3204 post.

[fol. 1232] Defendant's exhibit prepared under my direction shows the flow of Laramie River at Woods Landing for each of the years 1911 to 1932 and shows the flow of the river at that point had the total diversions by the Laramie-Poudre Tunnel and the Columbine and Bob Creek Ditches equalled 15,500 acre feet per year, during each of the years 1911 to 1932, inclusive.

In column 1 are entered the years 1911 to 1932. In column 2 is entered the yearly run-off of the Laramie River near Woods, as taken from column 4 of Complainant's Exhibit 52. Column 3 indicates the percent that each (1987) year's run-off was of 154,500 acre feet. Column 4 indicates the difference between the actual Tunnel, Columbine and Bob Creek Ditch diversions and 15,500 acre feet. Column 5 shows what the flow at Woods Landing would have been had the Tunnel and other minor diversions been diverting a total of 15,500 acre feet during each of the years 1911 to 1932. The values in column 5 are obtained by subtracting the values in column 4. Column 6 represents the percent of the water supply at Woods, after allowing for the full diversions by the Tunnel, would have been for each of the years 1911 to 1932 of 154,500 acre feet. For purposes of comparison, there has been entered in coumn 7 the percent that the April and October run-off of the Cache la Poudre was of the long time 1884 to 1932 mean.

I used the quantities from Complainant's Exhibit 52 to show the yearly run-off at the Woods station, rather than the quantities shown on Exhibit 35, for the reason that the mean of the run-off for the period 1911 to 1932, at Woods was somewhat higher on Complainant's Exhibit 35, than on Exhibit 52, so I took the one which showed the slightly lesser values. Defendant's Exhibit T-3 indicates that the Wyoming users received at Woods station from 1911 to

[fol. 1233] 1932, a mean of 157,510 acre feet or 102% of 154,500 acre feet.

(1988) Column 7 of the exhibit indicates that the flow of the Cache la Poudre River for the period of 1911 to 1932 was 98% of the long time mean. Defendant's Exhibit T-3 indicates that the Wyoming users during the period of exceptionally low flow in the years 1925 to 1932, received 141,400 acre feet per year or 91% of 154,500 acre feet.

During the period 1925 to 1932, I found upon referring to Defendant's Exhibit J-3 that the mean trans-mountain diversion made from the Laramie River in Colorado, excluding Sand Creek, for the period 1925 to 1932, inclusive, was 28,040 acre feet, and that is between 83 and 84 percent of the 33,500 acre feet, and if the use by the meadow lands of approximately 4,250 acre feet is added to those trans-mountain diversions, the total use during the period of low water supply, 1925 to 1932, by Colorado users, was 32,390 acre feet per year, or 86% of 37,750 acre feet. Since the decree of the United States Supreme Court in 1922, and for the period 1923 to 1932, inclusive, the Wyoming users have received an average of about 150,200 acre feet at Woods Station, and that amount is 97% of 154,500 acre
(1989) feet.

Computed from Defendant's Exhibit J-3, the aggregate mean annual trans-mountain diversion made by Colorado users between 1922 and 1932, excluding Sand Creek, was 27,157 acre feet and that is 81% of 33,500 acre feet. If the use made by the meadows for the meadow lands is added to the 27,157 acre feet of the trans-mountain diversions, the total mean annual use by Colorado users from 1922 to 1932 becomes 31,407 acre feet or 83% of 37,750 acre feet. Assuming that all uses remained the same on the Laramie [fol. 1234] River from 1911 to 1932, including the Skyline, Lost Lakes and meadow users, and that the Tunnel and other minor diversions had diverted a total of 15,600 acre feet each year, the mean annual amount of water passing Woods would have been about 148,660 acre feet, as indicated at the bottom of column 5, Defendant's Exhibit T-3 and that is 96% of the 154,500 acre feet, or if complainant's Exhibit 35 had been used as a basis of calculation, it would have been about 97%.

(1990) In comparing this exhibit, it was necessary to take whatever period for which the records were available and

compare that period with the run-off which occurred in other streams in the same vicinity and determine whether an apparent unusually high flow or series of high flow or low flow occurred within the period which would unduly distort the mean we took the period of 1911 to 1932. The simplest way to analyze stream flow to determine the occurrence of un-sually low or high cycles of run-off is to determine progressive means for periods of various lengths. I have analyzed the flow of the Cache la Poudre River from 1884 to 1932 by three year, four, five and six, seven and eight year progressive means. I found that the three year mean from 1930 to 1932 was 68% of the 1884 to 1932 mean and that there is only one other three year period since 1884, that the mean was as low or lower and that was for the period 1888 to 1890. Also the four year period 1929 to 1932, inclusive, showing the mean flow of the Poudre was 79% of the long time mean and there was only one other period since 1894 where the four year mean was equal to [fol. 1235] or lets than the 1929 to 1932 mean and that was during the period 1909 to 1913, a portion of which period is included in the years 1911 to 1932. The same situation existed in connection with the five year progressive mean, six year progressive mean, seven and eight year progressive mean. There is a remarkable conformity between these progressive means on the Laramie after corrections are made for full diversions by the Laramie-Poudre Tunnel. The two series of means as determined from columns 6 and 7 of Defendant's Exhibit T-3 may be compared as follows:

The three year mean on the Poudre from 1930 to 1932, inclusive, is 68% of the long time mean. The three year mean of the corrected flow of the Laramie at Woods for the same is 68% of 154,500 acre feet. The four year mean of the run-off of the Poudre for 1929-1932 is 79% of the long time mean, and on the Laramie for the same period it is 81% of 154,500 acre feet. Similarly the five year mean on the Poudre from 1928 to 1932, is 85% of the long time mean and on the Laramie is 87% of 154,500 acre feet. The six year mean from 1927 to 1932 on the Poudre was 83% of the long time mean and the mean of the Laramie for the same period is 87% of 154,500 acre feet. The seven year mean for the period 1926 to 1932 is 89% of the long time mean and on the Laramie is 90% of 154,500 acre feet. Also

the eight year mean on the Poudre from 1925 to 1932 is 86% of the long time mean while for the same period on the Laramie the mean is 87% of 154,500 acre feet.

In making the above comparison I have taken the flow of the Laramie River at Woods, as actually reported or estimated (1991) reduced by a sufficient amount of water to represent the depletion that would have resulted had the Tunnel and *and* other minor diversions equalled the full [fol. 1236] quantity of 15,500 acre feet.

By reason of the infrequency of occurrence of the unusually low years from 1925 to 1932 on the Poudre and from the marked close relation between the flow of the Poudre and that of the Laramie as evidenced by the above comparison, I would consider that the frequency of occurrence of the low years as indicated from 1925 to 1932 would be somewhat less than once in 22 years which the record from 1911 to 1932 indicates. I believe, therefore, that the mean for the period 1911 to 1932 would be somewhat below normal. This fact is also noted by the number of years during the period 1911 to 1932 when the flow was equal to or below the (1992) year 1913. The court in its opinion in the former case, found the year 1913 to have been unusually low and considered that that type of year would occur but infrequently yet in examining column 7 of Defendant's Exhibit T-3 it may be noted that the years 1911, 1919, 1922, 1925, 1930 and 1931 were equal to or below the year 1913 and that the year 1915, was only one per cent above the year 1913. Even if only the year 1931 were excluded from the series, the water supply that the Wyoming users would have received, had the tunnel and minor diversions aggregated 15,500 acre feet would have been 152,490 acre feet average for the period 1911 to 1932, or 99% of the 154,500 acre feet.

Taking into consideration the low period 1925 to 1932, and assuming that the Tunnel had been diverting its full capacity, the Wyoming users would have received during that period 134,900 acre feet per year, or 87% of 154,500 [fol. 1237] acre feet. The natural flow of the Cache la Poudre for the same period was 86% of long time mean, indicating the very unusual character of the run-off during that period. If the Tunnel in the future does not divert its full quantity for all years, that would have the

effect of raising the quantities given in column 5 of Defendant's Exhibit T-3.

(1993) The flow for none of the years 1911 to 1932 should be excluded on account of its being unusually high and therefore largely unusable. A perliminary storage study indicates that with a relatively nominal amount of storage aggregating some 150,000 acre feet, the water supply as shown in column 5 of Defendant's Exhibit T-3, could have been made to yield 154,500 acre feet per year for all of the years except 1911, 1913, 1915, 1916, 1931 and 1932. No water during the period would have been lost by spill from the reservoir. The shortages in the years 1911, 1913, 1916 and 1932 would have been nominal and negligible, while those in 1915 and 1931 would have been more severe.

When I speak of shortage, I mean an amount of water that is somewhat less than the ideal amount. Year after year in all of the irrigated regions shortages occur and in many years rather severe shortages occur. In the series of years above referred to severe shortages have occurred not only on the Cache la Poudre, but on the Arkansas and in the Rio Grande. An irrigated project, of course, cannot have a 100% water supply for all years, and does not expect to have a 100% water supply for all years. There is storage on the Laramie River in Wyoming and more reservoir sites are available and (1994) more storage construction is contemplated in that Basin.

By examination of columns 6 and 7 on Defendant's Exhibit T-3, it will be noted that there is a remarkably close relation between the run-off of the Laramie River at Woods, [fol. 1238] after the recorded flow is adjusted for full diversion by the Laramie Poudre Tunnel, and the run-off of the Cache la Poudre River at the Canyon. The means appearing at the end of the table are also very significant. The mean for the full period 1911 to 1932 of column 6 is 96% and would be about 97% if Complainant's Exhibit 35 had been used as a base. The mean for column 7 representing the flow of the Poudre for the same period is 98%. The two values are remarkably close. The mean for the period 1925 to 1932 embracing the recent period of very low run-off for column 6 is 87%. The mean for the same period for column 7 representing the run-off for the Cache la Poudre River is 86%. The flow of the Poudre is the

natural flow unaffected by uses of any sort. The flow of the Laramie at Woods as shown by column 5 is the flow after a more or less constant use has been assumed by Colorado users. If there were any items of use that had not been taken into account such as large increased consumption by the meadow lands or large unreported transmountain diversions that fact would have immediately reflected itself in a much lower supply at Woods and the fact would have been shown by throwing out of balance the indicated close relation between the flow of the Laramie at Woods corrected for the full diversions by the tunnel and the flow of the Cache la Poudre River. In (1995) other words, the mean for the period 1925 to 1932 of the flow of the Laramie at Woods after adjustment is made for full diversions by the Tunnel, would have been less than 87% of what appears to be about the normal flow under those conditions, or 154,500 acre feet. It will also be noted as a matter of fact, that since the tunnel was not making its full diversions from 1925 to 1932, the actual flow at Woods, was [fol. 1239] 91% of the 154,500 acre feet against the 87% for the Cache la Poudre River for the same period. I think that since the entering of the Court decree in the former suit in 1922, uses made by Colorado users of Laramie River water have not affected the water supply of the Wyoming users, but that the Wyoming users during that period have enjoyed the use of a mean amount of water allocated to Colorado users in amount of about 6,620 acre feet per year for the full period of 1922 to 1932.

(Defendant's Exhibit S-3 and Exhibit T-3 offered in evidence.)

Mr. Greenwood: No cross-examination.

[fol. 1240] OFFERS IN EVIDENCE

(1996) Defendant offers in evidence that part of Article XIV of its Constitution entitled "Mining and Irrigation," and being Sections 5, 6 and 7 of Article XVI of the Constitution of the State of Colorado. Defendant also offers in evidence Title 8 of the Compiled Laws of Colorado of 1921 relating to irrigation, drainage and water works districts, being Chapters 35, 36 and 37, under said title, and par-

ticularly the following numbered sections: Sections 1618, 1622, 1623, 1624, 1625, 1626, 1633, 1635, 1636, 1639, 1640, 1641, 1644, 1645, 1646, 1648, 1649, 1650, 1682, 1683, 1685, 1687, 1688, 1699, 1702, 1703, 1704, 1705, 1706, 1707, 1709, 1712, 1714, 1719, 1720, 1721, 1725, 1726, 1727, 1728, 1729, 1730, 1731, 1732, 1733, 1734, 1735, 1736, 1737, 1739, 1740, 1752, 1753, 1754, 1755, 1756, 1757, 1758, 1759, 1760, 1761, 1762, 1763, 1764, 1767, 1772, 1773, 1775, 1781, 1782, 1784, 1785, 1787, 1789, 1803, 1804, 1805, 1807, 1808, 1809, 1810, 1812, 1813, 1818, 1819, 1820, 1821, and 1822, together with amended Section 1818, as shown in the Session Laws of 1925, page 332, and in the Session Laws of 1929 at page 415. Also Section 1823, as amended in Session Laws of 1929 at page 414, abolishing the Division Engineer of Division No. 1 of the State of Colorado; Sections 1832, 1834, 1836, 1837, 1838, 1839, 1844, 1891, 1919, 1921, 1922, 1923, 1926, 1927, 1928, 1929, 1931 and 1932. We also offer Chapter 124 of the Session Laws of Colorado for 1925, being an act amending Section 1818 (1997) of the Compiled [fol. 1241] Laws of Colorado for 1921, and found at pages 332 to 334 of the said Session Laws; also, Chapter 115 of the Session Laws of Colorado for 1929, being an act concerning the office of Division Engineer of Division No. 1, being found at page 414 of said offer; also Chapter 116 of the Session Laws of Colorado for 1929, being an act relating to the installation of self-registering devices, and to amend Section 1818 of the Compiled Laws of Colorado of 1921, and being found at pages 415 to 418, inclusive, in said laws.

We also offer Title 9 of the Compiled Laws of Colorado for 1921, relating to corporations, being Sections 2238 to 2262, inclusive, and particularly Section- 2291 and 2364, inclusive.

[fols. 1242-1244] Note.—Defendant's Exhibit X-3 and Y-3 introduced on cross-examination of complainant's witness, Miss Zimmerman, are found at pages 2143 and 2144 of the transcript.

Defendant's Exhibit X-3 omitted. Printed side page 3205 post.

Defendant's Exhibit Y-3 omitted. Printed side page 3208 post.

[fol. 1245] NARRATIVE STATEMENT OF REBUTTAL EVIDENCE OF COMPLAINANT

Prepared by Counsel for Complainant State of Wyoming

[fol. 1246] (1998) The complainant offered the following evidence, in rebuttal, before E. O. Whittington, special commissioner, in the Senate Chamber of the State Capitol Building, City of Cheyenne, State of Wyoming, commencing at the hour of two o'clock p. m., July 5th, 1933.

Appearances:

For Complainant, the State of Wyoming: Honorable Ray E. Lee, attorney general for Wyoming; James A. Greenwood, Esq., special counsel for Wyoming.

For Defendant, the State of Colorado: Honorable Paul P. Prosser, attorney general for (1999) Colorado; Honorable Shrader P. Howell, assistant attorney general for Colorado; Messrs. C. D. Todd, William R. Kelly, William A. Bryans, III, and Lawrence R. Temple.

EDWIN W. BURRITT, a witness in behalf of the complainant:

Direct examination.

By Mr. James A. Greenwood:

My name is Edwin W. Burritt. I am State Engineer of Wyoming, which position I have had since July 1st. Prior to that time, I was deputy state engineer of Wyoming. I held that office from April 1st, 1933. I am not a graduate engineer of civil engineering. Prior (2000) to the time of being appointed deputy state engineer, I was a practicing civil engineer of the state.

As such State Engineer of Wyoming, I have in my possession the official records of my office. I have consulted those records recently to learn whether or not there was on file any copies of deeds conveying water rights from one piece of land in Wyoming to another piece of land, or for another use, and did not find any deeds of that kind. We examined the entire record from 1905 to 1912 on file in the State Engineer's office, and found no records disclosing a [fol. 1247] transfer of a water right from the land, for which it was originally adjudicated, to other land. Refer-

ring particularly to Sand Creek, I did not find any conveyance or transfers from one piece of land to another of water rights on that stream in this state, adjudicated under the laws of (2001) Wyoming. I find no record of any of those deeds, Defendant's Exhibits P-1 to D-2, in the State Engineer's office between 1905 and 1912.

There is not, within my knowledge, any instrument on record in the State Engineer's office purporting to show a transfer of adjudicated water rights to any one else, and for any other purpose, than the lands to which that water right was originally granted by the State of Wyoming and the Board of Control, under the name of the appropriator James Hardman, date of priority May, 1878, for irrigation, stock and domestic use—an application of .81 cubic feet per second; Peter Cunningham, date of priority May, 1885, use, irrigation, 8.65 cubic feet per second of time; the Alice Hardman, date of priority August, 1891, use, irrigation and stock, appropriation in cubic feet per second 4.57; Alice Hardman, November, 1894, use, irrigation, appropriation 1.79 cubic feet per second; together totalling 16.82 cubic feet per second of time. As to being certain of that, I would like to examine the records.

I have made a search of the records of my office to learn whether there appears there a record of a transfer of any of the water rights to which my attention has been directed, and I found a transfer of the No. 9 Enlargement, Enlargement Davis Brothers Ditch No. 2. The (2002) transfer was recorded May 13th, 1897. I did not find any other record of transfer. The transfer which I found reported in my official records, purports to be a transfer of one of the rights to which my attention was directed—No. 9 Enlargement, Alice Hardman.

Reading transfer from the record: "Miscellaneous Records No. 2, State Engineer's Office, page 196. Laramie, Wyoming, May 13th, 1897. For value received I hereby assign, transfer and set over unto Mrs. Maria Pascall all of my right, title and interest in and to the within described [fol. 1248] water or irrigating ditches known as Davis Brothers Sand Creek Ditch No. 2, and the Alice Hardman Ditch, including all rights, privileges and easements pertinent thereto, and all benefits to be derived therefrom, by

reason of the priority of appropriation of water from Sand Creek through the said ditches, when the priorities of right to use the water in said creek are finally adjudicated under the laws of this state.

(Signed) Alice Hardman. (Seal.) Witness: John H. Symons.

STATE OF WYOMING,
County of Albany, ss:

I, John H. Symons, commissioner of the United States Circuit (2003) Court for the District of Wyoming, do hereby certify that Alice Hardman, who is personally known to me to be the identical Alice Hardman whose name is subscribed to the foregoing instrument in writing, appeared before me this day in person and acknowledged that she signed, sealed and delivered the said instrument as her free and voluntary act for the uses and purposes therein set forth.

Given under my hand and official seal this 13th day of May, A. D. 1897.

(Signed) John H. Symons, Commissioner United States Circuit Court, District of Wyoming. (Seal.)

STATE OF WYOMING,
Engineer's Office, ss:

The within instrument was filed for record at 3:00 o'clock in the afternoon on the 20th day of May, A. D. 1897, and duly recorded in Book 2 of Miscellaneous Records on page 196.

(Signed) Elwood Mead, State Engineer."

I found no other record of any recorded transfer. As to whether I would say, from my search of the records in my office with reference to water rights on Sand Creek, adjudicated under the laws of Wyoming, there are or are [fol. 1249] not recorded any instruments purporting to transfer those water rights other than the one I have just referred to, I have not examined the other rights except between the years 1905 and 1912; there are no others during that time.

(2004) Cross-examination.

By Mr. C. D. Todd:

I do not know whether the ditches described in the assignment I read from Book 2, Miscellaneous Records of the State Engineer's office, as the Davis Brothers Sand Creek Ditch No. 2 and the Alice Hardman Ditch, is one or two ditches. The document I read does not describe what priority it is, and what the volume of the priority is, or anything of that kind, so as to identify it.

(2005) GEORGE WIDMAN, a witness recalled in behalf of complainant:

Direct examination.

By Mr. James A. Greenwood:

My name is George Widman. I am the same George Widman who was previously called as a witness for the complainant. I am deputy water commissioner at this time. As I previously testified, I have been water commissioner and deputy water commissioner in Districts four and five, which embraces Sand Creek.

I am familiar with the territory irrigated under the Sand Creek waters and the ditches that are taken out of Sand Creek. I know the lands formerly owned by Mr. Oda Mason, and I know some of the ditches used to irrigate those lands; I cannot recall all of the names of them, though.

(2006) That land is located on Sand Creek. I know the James Hardman Ditch, the Alice Hardman Ditch, the Leroy Ditch, and the Davis Brothers No. 2. Those ditches are used at the present time for the diversion of water from Sand Creek and the irrigation of lands, and from my own knowledge, they have been so used since I have been on as water commissioner—since 1922. I could not say whether [fol. 1250] they were used prior to that time, but I imagine so.

I have not seen the ditches this year, nor last year. I believe the last time I saw them was in 1931. They were still in use at that time. Of my own knowledge, they have

been used between the dates (2007) of 1922 and 1931. I wasn't out there every year, but I could say that the ditches were running; I had no occasion to go out there every year, you understand.

Sand Creek does not furnish ample water during the entire irrigating season to irrigate all of the lands for the appropriations that have been taken out from that creek; there is a shortage at times. The cause of the shortage is that there is just not enough water down there to go around to all the ditches, which is probably because it is used for some other purpose, or probably not enough water there; probably it could be either way. The other purposes I have in mind is the taking out of the water above through this Eaton Ditch so it would not get back to Sand Creek itself. As to that ditch being sometimes called the Divide Ditch, it is the Eaton Ditch I refer to, the one that empties into the reservoir. (2008) It diverts water from Sand Creek into an Eaton reservoir, which is in the Sand Creek watershed, I presume.

As I understand, the Eaton Ditch goes from the headgates on Sand Creek over into the reservoir, in the Sand Creek watershed, I would say. From where this ditch taps the Sand Creek water, it goes down into this reservoir, in Colorado.

I would not say that I know where Sheep Creek is, to be exact. The water from the reservoir does not come back into Wyoming; (2009) it goes down through Colorado. When it is diverted out of Sand Creek by the Eaton Ditch, it is taken from that stream and does not return to Sand Creek.

I have made a request of Mr. Eaton to release water down Sand Creek from the headgates. I made the request because the water rights in Wyoming were not getting their appropriations. I made such request on June 2nd, 1928; [fol. 1251] and again, on June 13th, 1927. I seen Mr. Eaton up at the reservoir, and the water commissioner from Colorado. In response to those requests, I could not say whether any water was released down Sand Creek past the Eaton Ditch diversion; I do not know as it was. I never went back to see—I had no occasion to go back there. (2010) I do not know whether they let the water down or not. They said they would let it down. I was never back there to check up to see whether they ever let it down.

(Complainant's Exhibit No. 91 marked for identification.)

(Photostatic copy of original field notes taken from current meter measurement on the Divide Ditch by the deputy water commissioner on June 14th, 1931.)

Complainant's Exhibit No. 91 is a current meter measurement made by me from the Divide Ditch on the 14th day of June, 1931. That is the field notes procured by my current meter measurement—the original field note of the data taken at that time the measurement was made by me. I was at that time deputy water commissioner.

Mr. Greenwood: Complainant offers its Exhibit No. 91 in evidence, and asks that a photostatic copy of the same be substituted in the record so that the original record may be withdrawn.

(2011) Referring to Complainant's Exhibit No. 91, and to a photostatic copy of the original field notes, as identified by me, the gauge heighth at the time I obtained that measurement was .95 of a foot, and the discharge was 19.93 second feet.

Cross-examination.

By Mr. C. D. Todd:

I testified before in this case. I also testified originally that I was up on Sand Creek, but not every year. I was water commissioner for eight years, and deputy for two years, being ten (2012) all told. As to whether I had any occasion to go up there to regulate the water on Sand [fol. 1252] Creek very frequently, Mr. Drummond took care of that the last two years. I was up there in June, 1927, and that was the time I met Mr. McAnnely and Mr. Eaton and asked them to turn down some water, and they agreed to do so. I do not know whether the water was turned down or not; I never had no occasion to go back. I never went back to find out whether there was any complaint.

On the other occasions, that I testified to, when I asked them to turn down some water, they agreed to do it, and I suppose they did. I never had any complaint that they did not get water—I never went back to find out.

The regulation of water on Sand Creek, by way of shutting down headgates, is just according to priority. They have headgates to (2013) shut down—the ditches I have been to had headgates. I have been to quite a few. There is no weirs on them—no way of measuring them.

I stated that I measured this ditch known as the Divide Ditch on June 14th, 1931. As to how much experience I have had in the measurement of water, I have measured quite a few ditches. I am not a regular engineer and make it a business of measuring weirs. In making up Exhibit No. 91, I handled the meter; a man by the name of Everett Lundquist made the notes. I do not know whether he is an experienced engineer; I do not know what experience he had.

(2014) In determining the measurement of my meter, I used the six tenths method. In making my measurement, if the water was a foot deep, I held the meter four tenths up from the bottom, or six tenths down from the top. I don't know whether Sand Creek in Colorado has water in it in any substantial quantity the year around; it did not in Wyoming. I don't know whether Sand Creek is dry, even when the Eaton Ditch was not drawing water, nor how late, and in how big quantities, the water runs. I was informed as to how much water Sand Creek carries only just when I was up there.

[fol. 1253] I live possibly thirty-five miles from there and did not visit very often, and only know just what I saw.

(2015) Oda Mason, a witness in behalf of complainant:

Direct examination.

By Mr. James A. Greenwood:

My name is Oda Mason. I reside on a ranch on the Big Laramie River, possibly three miles from Sand Creek, where I have resided for about nine years last past. Prior to that time, I resided on what was known as the Peter Cunningham place on Sand Creek. I resided there, I imagine, in the neighborhood of twelve years. I have lived in the Sand Creek vicinity in Wyoming since 1898 and am familiar (2016) with the Sand Creek territory, the watershed, and

most of the ranches on Sand Creek and the character of the land in that valley.

Irrigation has been practiced in the Sand Creek Valley in Wyoming, to my knowledge, since 1898, when I first seen it, and there was old ditches in before I first saw it. I know a good many of the ditches by name. I know the James Hardman Ditch. I do not believe I know any ditch by the name of the Peter Cunningham Ditch—that is the Leroy Canal. I know the Enlargement Davis Brothers No. 2, or the Alice Hardman, which is the same ditch, as I understand it; and the Enlargement of Davis Brothers Sand Creek No. 2. I am not so familiar (2017) with this Davis Brothers No. 2—I think I know it, but I am not so sure of it. I think I would know it as the Alice Hardman Ditch—if it was the same one, I would say I am familiar with it.

As to how recently I observed those ditches in the irrigating season, I saw them this last month, in June. They were diverting water at that time for the irrigation of the hay meadow. From my own knowledge, the James Hardman No. 2 Ditch, the Leroy Ditch, the enlarged Davis Brothers No. 2 or Alice Hardman Ditch, the enlarged Davis Brothers Sand Creek No. 2 have been actively used for irrigation purposes by diverting water from Sand Creek ever since 1898, [fol. 1254] up to the present year, and I know what lands have been irrigated by those ditches. I owned the Peter Cunningham place from 1907 up until 1928. I acquired it from (2018) James Hoge. I believe the title was in Mr. Bruce G. Eaton prior to the time Mr. Hoge owned it.

This Peter Cunningham land is watered by the Leroy Ditch, and during the time that I owned it, the water was never taken off or segregated from the land. Except the time of shortage when there was no water available, this land was always irrigated during the irrigation season; and the same condition would be true as to the other lands on Sand Creek, watered by these other ditches to which you called attention.

I am slightly familiar with the diversion works known as the Eaton dam and ditch on Sand Creek. I know that water is taken out of the channel of Sand Creek by means of that diversion works. As to what effect, if any, that has upon the ability to irrigate ranch lands in Wyoming on Sand Creek below the diversion works, it makes a scarcity of water ever since it has been in there. I would say there

has been a (2019) scarcity of water ever since Mr. Eaton put his water works up there, which was in the early 1900's. Prior to that time, there was not the same shortage of water; and that shortage has continued up to practically the present time.

Aside from the lands irrigated at the present time by the appropriations in the name of James Hardman, and Peter Cunningham, and Alice Hardman, of August, 1891, and also Alice Hardman of November, 1894, as to what effect the diversion of the water appropriated for these lands through the Eaton Ditch and into a foreign watershed would have upon other ranches in that valley, it would be just that much water that would not be return flow into the creek, and would have an injurious effect, I would say. I imagine there would be some evaporation, but the big part would return. In other words, I would say that the diversion of this water so that it does not return for further use in that valley, would contribute to a shortage.

[fol. 1255] (2020) As to whether, during the past ten years, there has been sufficient water in Sand Creek below the Eaton dam to mature the crops on the ranches in Wyoming in that valley, I would not hardly say so. There has been more or less of a shortage, made bad in some years, I would say, with drouth; but Mr. Eaton's diversion has hurt every year. As to that being a constant injury, I have never seen a year that Sand Creek was the same since he has been up there.

Cross-examination.

By Mr. C. D. Todd:

I stated that my name was Oda Mason; I am a son of Franklin P. Mason. I understood that my father acquired from Bruce Eaton, certain lands under Sand Creek in Sections 2 and 11 on which, by deed, the ditches were reserved. I have known all of these years that the Hardman, Hoge and Peter Cunningham lands were sold under the Leroy Ditch, the Davis Brothers Ditch and Alice Hardman and the Davis Brothers Sand Creek Ditch No. 2, to Bruce G. Eaton in the early 1900's. I understood (2021) that he deeded the lands to my father—that is, certain of the lands—and reserved the water rights. I understood that Mr. Eaton deeded Section 26, Township 14 North, Range 75 West, to James M.

Hoge, and reserved the water right pertaining to the land; it seems that everybody in that neighborhood was familiar with that fact, from hearsay. I understood that they reserved the water on these four ditches ever since up to the Eaton dam. When I acquired the land I own, I knew the water had been transferred since 1907. I did not buy it without these appropriations, I bought it with the water rights; Mr. Hoge deeded me the water rights. My abstract shows today that after he had deeded it to Mr. Eaton with the water rights and had taken it back without the water rights, he purported to deed me the water rights. When I acquired the lands, I felt that the water rights were (2022) reserved, and it has been so reserved and used ever since.

Sand Creek runs water practically every year. I have only seen it dry a time or two, and in a short period, a very [fol. 1256] short period of time. It was not dry this year; it was dry three years ago, for a short time. That, possibly, was in June, the latter part of June. I don't know whether the Divide Company was diverting any water at the time it was dry. It was dry along in 1916 or 1917, I would say roughly, in there somewhere. That does not miss the particular year very far; it was right in there close.

I know there is a difference in years in the quantity of water; I would say it was possibly a bad year for water, the year I am (2023) talking about. I do not know anything about whether the Eaton Ditch was diverting water at the time I say the creek was dry; I wasn't up there to see that. I imagine if the evidence shows that the Eatons only diverted water for two weeks in one of those years, that would indicate a very short run of water for anybody. If they were not diverting any, that could possibly be a time when there was no water up there to come to anybody. I would not say that Sand Creek has a habit of going dry at times; I have never seen this creek be what I would call exceedingly dry before Eaton came in there in 1898 and up to that time.

I was thirteen years old in 1898. I sure was observing the run of water in the creek then, and it is my recollection that there were two years when the water in the creek was so low that practically there was no water after the middle of June or the first of July. I (2024) did not say that was years when the Eatons were not running any water; I do not know what years the Eatons were not running water.

If I had made a business of hunting up these dates like you have, I would tell you what years the creek was dry. I live there, but I have a lot of things to remember besides when the creek went dry.

I would not say that we have any measuring devices in the ditches on Sand Creek for measuring the water between them. After the middle of June, we do not hardly need any means of measuring the water, because, just in my imagination, Mr. Eaton has the water. If my imagination chances to be wrong, I guess it would be wrong; I never (2025) was [fol. 1257] up there to see. As to whether I know anything about whether his ditch or the weather was the cause of the slight flow of water in the creek, I would say, from my observation from 1898 up to 1902 or 1903, after Eaton came in there, of what happened in that creek from that time on to the present date, it would have to be him that was getting the water, or somebody took it out with a bucket.

Comparing Sand Creek is a very good thing—I can watch the watershed, compare the two streams, and Sand Creek does not hold up like the river does. Sand Creek is a very short stream compared with the Laramie River, but it drops much earlier. I cannot say that it has a very small watershed; what made Sand Creek carry so much water before? As to its depending upon how much rain and snow, do you think it turned dry all of a sudden, and we did not have any rain or snow from then on? Sometimes, but I would say from 1898 it has varied, but not on the river.

Sand Creek has done very well this year. I would not say (2026) much better. I never measured Sand Creek; I do not really know what the flow of Sand Creek is, but I know when it is high and not high. I would say it done pretty well this spring, a pretty good head of water, much better than it has for three years. What I call a good head depends on the size of the stream. Some of the size of the stream depends on the snowfall and the rain, but it depends on the length of the watershed, I would say. The watershed supply this year seemed to be pretty good. It has held up well and is going pretty well. The river is holding up much better than Sand Creek; I imagine you know that.

Sand Creek does not get water from the river, but it has practically the same watershed, the same country, where a snow storm hits the two. The Laramie stream extends farther up into the mountains than Sand Creek and gets a

larger flow of water than Sand Creek—it is a (2027) bigger stream. I would not say that its going up higher into the mountains, with the natural snows and melting, it would continue to flow longer.

[fol. 1258] Redirect examination.

By Mr. James A. Greenwood:

As to my being asked by counsel as to whether, since Eaton acquired the ranches on Sand Creek with the water rights, and reconveyed them back to other parties, the water had been segregated from use since that reconveyance and these ranches are not now irrigated by waters from Sand Creek, they have always been irrigated by water from Sand Creek. There never has been any segregation of the water right from the land. These ranches have continued to irrigate just the same from the common supply in Sand Creek. They never have been shut off; it was never even questioned.

As to my being interrogated with reference to the property I purchased and whether I purchased it without a water right, I stated (2028) that I acquired it with a water right, and I have used the water each year. The land which I purchased from Mr. Hoge has not been deprived of the use of the water, or the right to divert water, since the time I purchased it, and the water right, which was originally granted to this land, has been used during all of the years that I owned the land as a basis of a right to divert water from Sand Creek. The appropriation is my authority to divert it from Sand Creek, and I have so diverted it.

I do not own the Cunningham ranch at the present time. I owned it until in 1928, so that up to 1928, the water right was used on that ranch. The same condition prevailed as to the other ranch lands to which you directed my attention, where Mr. Eaton acquired the properties (2029) and resold the land to other parties.

Recross-examination.

By Mr. C. D. Todd:

When I bought the land, I understood that the appropriations of water from the Leroy Ditch and the James Hard-

man Ditch and the Davis Brothers No. 2—Alice Hardman, and the Davis Brothers Sand Creek No. 2, with the land, had been sold, and the water rights reserved by Eaton. I imagine that Mr. Eaton and his company have been diverting that water up at the Sand Creek dam in Colorado ever since; I have never been up there to see it done. I have used the water continuously on my land since. I do not think it [fol. 1259] was some other appropriation of water; I felt it was the same appropriation. So I sold my cake and am eating it.

Redirect examination.

By Mr. James A. Greenwood:

These lands I speak of are in Wyoming, and the ditches diverting water are also taken out in Wyoming. I was asked by Mr. Todd whether I knew, at the time I purchased this land, that Mr. Eaton had (2030) reserved the water rights. I purchased this land in 1907, in June, I believe. I understood, at that time in 1907, that the laws of Wyoming did not permit the sale of a water right and the segregation of it from the land for which the water right was taken out, and that entered into my consideration in purchasing this land from Mr. Hoge. I calculated that I was protected with my water right; Hoge assured me that I was, because of the laws of Wyoming.

Recross-examination.

By Mr. C. D. Todd:

I paid a thousand dollars for the land I took from Hoge. The Leroy Canal was the ditch originally built for the Cunningham place. I do not have my deed with me. I do not own the land that Franklin P. (2031) Mason purchased from Bruce Eaton; I have never owned it. My father has owned it, but he sold it. He is living.

(2032) (Complainant's Exhibits Nos. 92 and 93 marked for identification.)

(Set of discharge measurement notes made by Goyne Drummond on July 17th, 1929, at the outlet of the Laramie-Poudre Tunnel, and set of discharge measurement notes made by Goyne Drummond on June 21st, 1932, at rating flume of the Divide Ditch on Sand Creek.)

JOHN A. WHITING, a witness recalled in behalf of complainant:

Direct examination.

By Mr. James A. Greenwood:

Mr. Greenwood: For the purpose of convenience, I will call Mr. Whiting to identify these exhibits.

I have testified in this case. Prior to April 1st of this year, I was State Engineer of Wyoming, and am familiar with the records of that office. Complainant's Exhibit No. 92 is a set of discharge measurement notes made by Goyne [fol. 1260] Drummond on July 17th, 1929, (2033) at the outlet of the Laramie-Poudre Tunnel. Goyne Drummond was a special assistant state engineer employed by me in the office at the time this record was made. It was turned into the State Engineer's office, and is an original record of that office. It refers to the water at the Laramie-Poudre Tunnel, and is a measurement of discharge of the water from that tunnel to the structure at the east portal, including the Venturi flume. The gauge height stated in that record is two feet, and the discharge, 91 second feet; it was taken on July 17th, 1929.

Complainant's Exhibit No. 93 is a set of discharge measurement notes made by Goyne Drummond, a special assistant state engineer, on June 21st, 1932, at the rating flume of the Divide Ditch, which diverts water from Sand Creek to Sheep Creek in Colorado. It is an original record in the office of the State Engineer in Wyoming. It was made at (2034) the time I was State Engineer, and under my direction. It gives the gauge heighth as 1.55 feet, and the discharge as 43.76 cubic feet per second. The date of that is June 21st, 1932.

Mr. Greenwood: Complainant now offers its Exhibit No. 92, and asks that it be received as evidence in the record with permission to substitute a photostatic copy for the original. Complainant makes a similar offer with reference to Exhibit No. 93.

You may cross-examine, if you wish. I want to call this witness later for his chief rebuttal; this was merely for the purpose of identifying these exhibits.

Mr. Kelly: The defendant objects to Complainant's Exhibit No. 92 as hearsay and incompetent, irrelevant and im-

material, and it is not shown that the record kept was one of the duties of the man supposed to have made it, and being in contradiction of the testimony of the person who is supposed to have made the record.

[fol. 1261] (2035) RALPH I. MEEKER, a witness recalled in behalf of complainant:

Direct examination.

By Mr. James A. Greenwood:

I am the same R. I. Meeker who testified previously in this case as a witness for the Complainant. I have seen Defendant's Exhibit I before and have observed what it purports to contain. The caption is "meadow lands in Colorado irrigated from the Laramie River and tributaries." The irrigated tracts are shown on the map below the Glendevy gauging station on the Laramie River and tribuaries; no irrigated tracts are shown on the map above the mouth of Nunn Creek at the Glendevy gauging station.

I heard Mr. Downing's testimony with reference to Exhibit I, and have since examined this exhibit. From my examination, and such other information as I have, this exhibit does not correctly show all of (2036) the lands irrigated from the Laramie River and tributaries in Colorado. I base that answer upon records in the annual field books of the water commissioner of District 48, of the Laramie River and tributaries, and a personal field trip in June, 1933, and also, observations prior thereto.

The extreme upper portion of the Laramie River Basin in Colorado is irrigated from the Laramie River and tributaries, but is not shown on Defendant's Exhibit I, including the Laramie River Tunnel and the Glendevy gauging station. That territory is approximately ten miles in length, and a matter of a mile or so in width, and is the south end of the valley.

Nunn Creek enters the Laramie River just above the Glendevy gauging station, from the east side. With reference to irrigated lands in that valley in Colorado, as to whether the Downing map reports any irrigated area above the mouth of Nunn Creek, referring to the legend on the

map, the meadows are shown as green, the irrigated pasture is yellow, and the irrigated sagebrush is brown, with the willows, which are not irrigated, in pink. The only color appearing above the Glendevy gauging station, above the [fol. 1262] mouth of Nunn Creek, is the pink color for (2037) the willows—no irrigated land is shown. There is irrigated land there. As to what I base that answer on, as I previously stated, upon personal observations and annual reports of the water commissioner of District 48. I last examined that valley with reference to determining the area irrigated in Colorado in June, 1933. I found ditches there diverting in that area above Nunn Creek.

On page 3 of water commissioner's field book, District 48, State of Colorado, for the year 1928, being the water district in which the Laramie River Valley in Colorado is located, is listed the Brown Ditch from Porter Creek, above the mouth of Nunn Creek. Thirty-five acres are shown as irrigated, water was used on the 1st day of May, and last used on July 25th, being a period of seventy-six days; and 334.4 acre feet were used. No land is shown on Defendant's Exhibit I as irrigated under the Brown Ditch. I have personal knowledge that the Brown Ditch is functioning and irrigating—on June 24th and 25th, 1933, that ditch was diverting water. I observed that ditch at that time, and from (2038) my observation, it had the appearance of being a ditch which has been in regular use.

With reference to other ditches, in the 1928 report, as to whether they are shown on Exhibit I and whether they are diverting water, referring to page 4, the Ben Warren Ditch, I find that 25 acres are shown as irrigated. Water was first used on May 10th, and last used on July 1st, a period of fifty-two days, 218 acre feet are reported as used. Referring to page 5, the Brinker Ditch from Brinker Creek, I find 30 acres reported as irrigated; first day water was used, May 10th, last day, July 14th, a period of sixty-five days, with 364 acre feet reported as diverted. Referring to page 33, Link Ditch No. 1, from the Big Laramie, I find 90 acres reported as irrigated; water was first used May 25th, last used July 20th, a period of fifty-two days; 800.8 acre feet being diverted, according to the report. On page [fol. 1263] 33, Link No. 2, an enlargement from Link Creek, 40 acres reported as irrigated; first day water was used, May 25th, last day, July 20th, a period of forty-three days;

309.6 acre feet being diverted. Page 35, the Charles E. Lanning Ditch from the Big Laramie, 100 acres reported as irrigated; water first used May 1st, last used June 30th, a period of sixty-one days; 292.8 acre feet being diverted. Page 36, Lanning-Springer Ditch, from the Winfred and Rapid Creeks—about 65 acres irrigated; no hay cut, used for pasture; first day water used May 10th, last day, June 30th, (2039) a period of fifty-one days, 397. acre feet diverted. Page 42, Nunn Creek Ditch, from Nunn Creek, the same land as is irrigated under Priority No. 44; no hay cut, used for pasture; first day water used May 10th, last day May 30th, a period of twenty days; 116 acre feet reported as diverted. Page 57, Springer Ditch, from the Big Laramie, no item is shown as irrigated, although the statement occurs "25 acres, no hay cut, used for pasturage." First day water used, May 10th, last day water was used June 25th, a period of forty-six days; 257.6 acre feet diverted. The total acreage irrigated from the ditches I have named, and shown by the 1928 water commissioner's field book report, is 410 acres, as read from the book. None of that 410 acres is shown on Colorado's Exhibit I as being irrigated.

Referring to page 3 of water commissioner's field book of the State of Colorado, District 48, for the year 1929, I find, with reference to a similar situation there, the Brown Ditch from Porter Creek, 35 acres reported irrigated; water first used May 15th, last used July 20th, a period of sixty-six days; 343.2 acre feet diverted. At page 4, Ben Warren Ditch from the Big Laramie, 25 acres reported as irrigated; first day water was used June 10th, last day July 30th, a period of fifty-one days; 204 acre feet being reported as diverted. At page 5, the Brinker Ditch from Brinker Creek, 30 acres reported as irrigated; water (2040) used first day May 15th, last day July 20th, a period of sixty-six days; 422.4 acre feet diverted. At page 32, Link No. 1 Ditch from the Big Laramie, 90 acres reported irrigated; water used first day May 15th, last day [fol. 1264] July 14th, a period of sixty days; 840 acre feet reported as diverted. At page 33, Link Ditch No. 2 from Link Creek, 40 acres reported as irrigated, first day water used May 15th, last day July 1st, a period of forty-seven days; 198 acre feet reported as diverted. Charles E. Lanning Ditch from the Big Laramie River, on page 35, 100

acres reported as irrigated; on June 18th, the ditch was diverting 3.2 second feet; on June 28th, 4.0 second feet; on July 10th, 7.3 second feet; on July 31st, the item occurs "check water". The water commissioner has not computed the acre feet values. On page 36, the Lanning-Springer *Ditch from Winfred and Rapid Creeks*, 65 acres reported as irrigated; water first used May 20th, last used July 24th, a period of sixty-five days; 335 acre feet reported as diverted. Page 42, Nunn Creek from Nunn Creek, no acreage reported excepting the following note, "same land as irrigated by Priority No. 44; no hay cut, used for pasture". Page 57, the Springer Ditch from the Big Laramie River, no acreage reported, with an item, "no hay cut, used for pasture", and "25" over those words; first day water used May 15th, last day June 30th, a period of forty-five days; 189 acre feet reported as diverted.

(2041) Referring to water commissioner's field book for District 48, for the year 1930, with reference to the acreage shown to be irrigated in the Laramie Valley, as contrasted with that disclosed on the Downing map, I find on Page 3, the Brown Ditch from Porter Creek, 35 acres reported as irrigated; water first used May 20th, last used July 8th, a period of forty-eight days; 172 acre feet reported as diverted. On page 5, Brinker Ditch from Brinker Creek, 30 acres reported as irrigated; no dates as to when water was first and last used, or the amount diverted; the item occurs, "no meadow cut, used for pasturage". On page 32, Link Ditch No. 1 from the Laramie River, 90 acres reported as irrigated; water first used May 20th, last used July 25th, a period of forty-eight days; there is a note, "18 days off"; 652 acre feet reported as diverted. Page 33, Link No. 2 Ditch from Link Creek, 40 acres reported as irrigated; [fol. 1265] first day used June 26th, last day July 25th; "off June 30th to July 19th"; number of days water carried, ten days; 60 acre feet reported as diverted. Page 35, Charles Lanning Ditch from the Big Laramie, 100 acres reported as diverted; May 21st no water being diverted; July 8th no water being diverted; and no record of the amount diverted. Page 36 Lanning-Springer Ditch from Winfred and Rapid Creeks, no acreage reported; May 21st no water diverted; July 8th no water diverted; and no data

(2042) given as to the water diverted; "about 65 acres, no hay cut, used for pasture".

With reference to the reported diversions of water and the irrigation of lands not shown on the Downing map, on page 3 of a similar report for the year 1931, I find the Brown Ditch from Porter Creek, 35 acres irrigated; water first used May 19th, last day May 26th; a period of seven days; 36.4 acre feet reported as diverted. On page 5, Brinker Ditch from Brinker Creek, no acreage reported as irrigated, although water was first used May 19th, last used May 26th, number of days seven; 29.4 acre feet; "no meadow cut, used for pasture"; same land under Priority No. 44. Link Ditch No. 1 of the Big Laramie, page 32, 90 acres reported as irrigated; water first used May 15th, last used July 16th, a period of sixty-two days; 744 acre feet reported as diverted. On page 33, Link No. 2 Ditch from the Branch of the Big Laramie, Link Creek, on the west side; 20 acres reported as irrigated; water first used May 20th, last used July 10th, a period of fifty-one days; 306.6 acre feet reported as diverted. At page 35, Charles E. Lanning Ditch from the Laramie River, headgate near tunnel; no acreage irrigated, and an item "no water diverted". At page 36, Lanning-Springer Ditch from Winfred and Rapid Creeks; no acreage reported as irrigated, with the note "no water diverted". At page 57, the Springer Ditch from the Laramie River; no acreage reported as irrigated, and a note "no water diverted".

(2043) Referring to a similar report for the year 1932, I find, with reference to lands reported as irrigated, and di-
[fol. 1266] versions of water from the Laramie River in Colorado, not shown by the Downing map, Exhibit I, at page 3, the Brown Ditch from Porter Creek, 35 acres reported as irrigated; water first used May 20th, last used June 15th, a period of twenty-six days; 140.4 acre feet reported as diverted; "the same land as under Priority No. 67; no meadow, used for pasture". Page 4, the Ben Warren Ditch from the Big Laramie, near the tunnel; no acreage reported, and the item "no water diverted, natural run". Page 5, the Brinker Ditch from Brinker Creek; no acreage is reported as irrigated; it says "natural run from about May 15th to June 20th, a thirty-six day period"; 187.2 acre feet reported as diverted; "no meadow cut, used for pasture; same as under Priority No. 44". At page 32,

the Link Ditch No. 1 from the Laramie River; 90 acres reported as irrigated; water first used May 22nd, last used July 30th; a period of sixty-nine days; 358.8 acre feet. At page 33, Link Ditch No. 2 from Link Creek, a branch of the Big Laramie; 20 acres reported as irrigated; water first used June 13th, last day July 30th; water carried sixteen days; and I notice the following items at the left—"May 26th, no diversion; breaks in ditch; June 13th, 2.3 second feet; June 28th, no diversion, break in ditch, off"—it is difficult to read, I think it is nine days—"July 15th, 2.5 second feet; July 19th, 2.2 second feet; July 26th, 2.44 second feet; 76.16 acre feet reported as diverted". At page 35, Charles E. Lanning Ditch from the Laramie; first ditch out of (2044) river below the tunnel; no acreage reported as irrigated; water first used June 14th, last day July 25th, a period of fifteen days water carried; 75 acre feet reported as diverted. It says "off twenty days", June 2nd, the item appears, "no water being diverted after natural run-off". Then, on June 14th, 2.0 second feet; June 15th, 2.0 second feet; July 19th, 3.6 second feet; not used on meadows, "not reaching lands". And then the item, "off meadow to use on pasture lands". This ditch was repaired before July 19th. On page 36, Lanning-Springer Ditch from Winfred [fol. 1267] and Rapid Creeks, headgate on Winfred Creek; no acreage reported; first water used about June 2nd, last day about July 16th; water carried fifteen days; 63.0 acre feet reported as diverted. Then, I see an item "off about twenty-nine days. On June 2nd, 2.5 second feet, estimate; June 14th, no water; July 15th, 2.0 second feet", as the amount of water in the ditch. Page 57, the Springer Ditch; no acreage reported as irrigated; water first used about June 2nd; last day June 16th, a period of fifteen days; 66 acre feet reported as diverted; and then, the following item —"July 2nd, 2.5 second feet; July 14th, 2.0 second feet", as the amount of water in the ditch, and, "break in ditch, no water diverted from Laramie River on account of break in ditch; about 2 feet of water in the lower end of ditch from Last Creek."

Those annual reports are prepared, and the data appearing therein is gathered by the water commissioner of Water District 48, (2045) of the Laramie River and its tributaries, who is a state official of the State of Colorado. The report for the year 1928, on page 90, is signed by Rob-

ert A. Mosier, water commissioner of Districe 48, and it has been acknowledged before a notary. I do not know Mr. Mosier's signature. Referring to the book for the year 1929, on page 90, occurs the signature of R. A. Mosier, with an acknowledgment before a notary. For the year 1930, on page 90, appears the signature, "R. A. Mosier, water commissioner of District 48", with the acknowledgment before a notary. For the year 1931, on page 90, appears the signature of R. A. Mosier, with the acknowledgment before the notary. For the year 1932, on page 90, appears the signature of R. A. Mosier, water commissioner of District 48, with the acknowledgment before the notary. These are the same reports, or official records, to which I previously testified in this case.

The Downing map, Exhibit I, shows a lesser amount of acreage in the Laramie River Valley in Colorado, irrigated from the (2046) Laramie River and tributaries during [fol. 1268] the year 1931 than is actually irrigated. Considering the fact that the official records, being the field books made by water commissioner Mr. Mosier of District 48, in which the meadow lands in Colorado and the Laramie River Valley are located, is an official report and verified and sworn to by this official, in my judgment, the water commissioner's reports would be the more accurate records as disclosing the exact number of acres irrigated in the area above the Glendevy gauging station and the mouth of Nunn Creek, for the reason that the Downing map, Exhibit I, shows no lands irrigated above that point.

Referring to the statement of Mr. Mosier, in which he said, "In view of the fact that there has been a survey of the acreage of the land, and the annual report being only estimates, I would say that during those years the reports were unreliable," in reply to the question, "Having in mind the source of your information and everything you have relied upon to make up that report, do you now consider those annual reports to be reliable, or unreliable?", I would say that Colorado's Exhibit I, the Downing map, is not a reliable source from which to determine whether the Mosier report was accurate or inaccurate with reference to the lands above Glendevy at the mouth of Nunn Creek.

Defendant's Exhibit I, being the Downing map, does not (2047) show the Lone Tree Ditch. This Lone Tree Ditch enters the Laramie River approximately three and a half

miles below Glendevy gauging station, and from the east side of the river, and is below the mouth of Nunn Creek. This Lone Tree Ditch has one of the early priorities on the Laramie River, Priority No. 28, of date October 24th, 1924, twenty-five second feet decreed. The headgate of that ditch is located in Section 11, Township 10 North, Range 76 West.

Referring to water commissioner's field book for District 48 for the year 1928, at page 34, it discloses Lone Tree Ditch from Lone Tree Creek, 200 acres are reported as irrigated; water first used May 10th, last used July 25th, a [fol. 1269] period of seventy-six days, 1033.6 acre feet reported as diverted. On May 26th, under the column "Amount of river water in ditch," 11.8 second feet; June 1st, 13.7; June 14th, 7.3; June 28th, 4.2; July 2nd, 3.0; July 17th, 1.0; 240 acres are reported that can be irrigated under the ditch.

(2048) I said that the Downing map does not show the Lone Tree Ditch. That would indicate to me that the Downing acreage reported as irrigated from the Lone Tree Ditch, in the amount of 200 acres, was not embraced in the computations of the professor in reporting the irrigated acreage—the map of Professor Downing is incomplete.

From my knowledge of the Laramie River Valley in Colorado, I would say that the acreage irrigated in that valley can be extended physically beyond the amount of 4,250 acres—the conditions are such as to permit considerable acreage of land now not irrigated to be brought in. I base that answer upon my personal examination of the area at two or three different times. I have specific data or information in mind that would permit this expansion in the way of existing ditches by possible construction.

On the area above Glendevy gauging station and the mouth of Nunn Creek, there is a considerable acreage in sagebrush lying under existing ditches that can easily be irrigated, and below the Glendevy gauging station, under the Timothy Ditch from the Laramie River, the Timothy Ditch diverts from the Laramie River on the east side about two and a half miles below the Glendevy gauging station and traverses the mesa which lies on the north side of the river and above Jimmy Creek, and there is a considerable area under that Timothy Ditch that is not now irrigated that could be readily irrigated.

(2049) Under the Stewart No. 2 Ditch from McIntyre Creek, which is now inactive, from fifty or sixty acres can be irrigated. I examined that ditch individually, I would have to look up the date, in the last two or three years, and found there was a break just below the headgate about six [fol. 1270] hundred feet or a thousand feet, which can be easily repaired, and the water commissioner's reports show that that ditch was active prior to two or three years ago.

Also, under the Forester Ditch, from Forester Creek, which ditch takes out from the left side of the creek and covers a considerable tract of raw land, this ditch is one that traverses land toward Grace Creek, and is at a distance of approximately two miles from the Laramie River, covering native land, probably four or five hundred feet above the river. And, as previously indicated, the Lone Tree Ditch covers considerable land which is not irrigated, which may be readily irrigated.

I have examined the annual reports of the water commissioner for the years 1928 to 1932, to learn whether those reports indicate and report lands that could be irrigated, as well as lands that are irrigated, and they contain such information. There are two classifications—lands irrigated, and lands that can be irrigated. The difference between the total quantities in the Laramie River and its tributaries, exclusive of Sand Creek, ranges from sixteen hundred to two thousand acres. Based upon my own personal examination, covering several trips, and based upon the water commissioner's reports also, (2050) I would state that approximately two thousand acres, and a minimum of sixteen hundred acres—not less than sixteen hundred acres—are susceptible of irrigation in the Laramie River Valley in Colorado, in addition to the 4,250 acres which are now irrigated, according to the Colorado testimony.

I stated that I made an inspection of this valley this year, on June 24th and 25th, 1933. As to what observations I made upon that inspection trip with reference to irrigation above Nunn Creek and Glendevy gauging station, I spent the afternoon of June 24th, and a considerable part of the morning of June 25th, examining the area above the mouth of Nunn Creek, up as far as the Laramie-Poudre Tunnel, [fol. 1271] and a mile and a half beyond that point. I found four ditches diverting water, and two or three ditches not diverting water. The Springer Ditch was diverting one

second foot, and the water was being applied to the land—pasture land. The Brinker Ditch was diverting approximately two second feet, and this water was being applied to the land. The Brown Ditch was diverting approximately one and one-half second feet, the water being applied to the land. The Link Ditch No. 1 was diverting four second feet, and this water was being applied to the land.

The Brinker and Brown, and the Link No. 1 Ditch, are shown on the Downing map, but the Springer Ditch is not shown. The (2051) ditches are shown, but they are not portrayed in the legend as diverting water or irrigating. The Springer Ditch, to make it clear, which exists and diverts water, is not shown on the Downing map, Exhibit I. None of the land irrigated by these ditches is shown on the Downing map—no irrigated land is shown under those ditches.

I found other ditches on this trip that were above the Glendevy gauging station, but not diverting water at that time. There is a ditch which fits the description of the Charles E. Lanning Ditch, an old ditch, now inactive, located about two miles above the headgate of the intake canal of the Laramie-Poudre Tunnel. Then, the Lanning-Springer Ditch, as is decreed, diverts from a couple of miles across on the west side of the Laramie River. No Lanning-Springer Ditch is shown on the Downing map, Exhibit I, although a Charles E. Lanning Ditch is shown three or four miles in length on the west side of the Laramie River, which is the first ditch taking water from the Laramie River below the intake of the Laramie-Poudre Tunnel, and that ditch's headgate is located approximately a half mile below the intake.

Then, there is the Ben Warren Ditch, which I visited, which is not shown on the map, and which is located on the west side of the Laramie River; and an old ditch known as [fol. 1272] the Long Park Ditch, which is inactive. I believe that covers the situation.

(2052) The Charles E. Lanning Ditch had indications of having been used recently. I noticed that particularly, because there were sacks of earth at the upper bank of the ditch at several points weher there were breaks, and where there were some fresh breaks. The indications were that it had been recently used, not only from sacks, but even from shovelfuls of dirt in the outer bank were fresh, in-

dicating that the ditch had been used within the last two years for irrigation. The Charles E. Lanning Ditch can irrigate the largest tract of land in a compact area above the mouth of Nunn Creek. There is one tract of land, which I traversed on June 25th, 1933, of at least one hundred acres, which has been irrigated and in which laterals were found, and then there are considerable areas at various points along the ditch which would indicate that amount. In addition, there is considerable sagebrush land which has never been irrigated, susceptible of irrigation.

The Lone Tree Ditch was diverting approximately one second foot of water at the time of my visit on June 25th, and the amount of land that was under irrigation, from my observations at that time, was, in round figures, forty acres.

(2053) I visited the Sand Creek, or Divide Ditch on June 25th, 1933.

Mr. Howell: We object to that—before we go into that, Mr. Greenwood, the defendant wants to object, and to move to strike all testimony of this witness, with respect to the statements that additional acres of land can be irrigated and are subject to irrigation, in addition to the 4,254 acres as indicated by defendant's testimony, for the reason that it is not rebuttal testimony, but is testimony in chief. The issue is plain, the question of acreage and the extent of acreage is set out in the complainant's complaint, and certainly are a part of the original case, and it is improper to introduce that on rebuttal.

[fol. 1273] We further object and move to strike all testimony of this witness along the line as to what may or might or possibly could be done in the future with respect to the irrigation of the meadow lands, for the reason that it is pure speculation and has no foundation upon which to base such testimony.

We object for the additional reason that it is entirely improper to introduce testimony of this kind on rebuttal.

Mr. Greenwood: I state for the record, in response to counsel's objection, that this testimony is offered to rebut the testimony of the witnesses for the defendant State of Colorado, tending to show and establish the fact that the physical conditions in the Laramie River Valley are limited to a possible irrigable area of approximately 4,250 acres of land.

I inspected the rating flume on the Divide Ditch on my (2054) visit, on June 25th, 1933, and found the staff gauge in the flume registered 1.41 feet—a considerable flow of water was in the ditch. I found heavy deposits of gravel in the upper end of the flume and in the canal just above the flume, and in the lower end of the flume, and just below the rating flume. At the left side of the upper end of the flume the gravel was 0.5 feet in depth. The condition of the flume indicated that it had been cleaned very recently. I took seven cross-sections of the depth of the water at two foot intervals, both across the ditch, above and below the rating flume, and within the flume. These cross-sections were taken at four foot intervals. A study of the cross-sections shows that gravel deposits are from 0.4 to 0.5 feet, above the rating flume in the canal, and immediately below the rating flume in the canal prism. The profile down the center of the ditch at the rating flume shows a drop in the gravel deposit in the upper end of the rating flume from 0.4 to 0.5 feet for a distance of about [fol. 1274] twelve feet, then an abrupt rise of 0.4 to 0.5 feet at the lower end. This pocket in the grade of the canal in the rating flume would fill up with gravel if the flume were not cleaned frequently.

(Complainant's Exhibit No. 94 marked for identification.)

(Cross-section in the rating flume of the Sand Creek or Divide Ditch, taken on June 21st, 1932.)

Complainant's Exhibit No. 94 is a cross-section in the rating flume of the Sand Creek or Divide Ditch, which was taken on June 21st, 1932, at the time of the meter measurement by Goyne Drummond, who (2055) testified at Page 220 of the Wyoming testimony with reference to the measurement. It is plotted from Complainant's Exhibit No. 93. The object of the graph is to show the gravel deposit in the left side of the flume at the measuring bridge. At the time, the gauge heighth was 1.55 feet, and the discharge, 43.76 second feet. This exhibit shows the gravel deposit in the flume at the left side, which is approximately three tenths of a foot in depth, and extends for a distance of four feet, and then declines to approximately no depth at seven feet.

Mr. Greenwood: Complainant now offers in evidence its Exhibit No. 94, and asks leave to substitute a photostatic copy for the original.

(Complainant's Exhibit No. 95 marked for identification.)

(Table prepared by R. I. Meeker of all the current meter measurements made at the concrete rating flume of the Sand Creek or Divide Ditch during the period of 1929 to 1933 and entered as testimony in the present case.)

Complainant's Exhibit No. 95 is a table of all the current meter measurements made at the concrete rating flume of the Sand Creek or Divide Ditch during the period of 1929 to 1933, entered as testimony in the present case. These measurements were made at the concrete flume, 10.5 feet wide, 16 feet long, and the table compares the values given by the rating table, which was made in 1922 by Mr. [fol. 1275] McAnnely, and has been used continuously from 1922 to 1933. The table was prepared by myself. Column 1 gives the dates of the measurements; column 2, the gauge heighth in feet on the staff gauge; column 3, the current meter measurement or measured discharge in second feet; column 4, (2056) the appropriate values for the gauge heighths in column 2, as taken from the 1922 rating table; column 5 gives the difference in second feet between the meter measurement and the rating table values; and column 6, the variations in per cent; column 7, the hydrographer; and column 8, a reference to where the testimony or exhibits may be found in the pending case. At the bottom of the table is shown the 1922 rating table of the Sand Creek or the Divide Ditch, which was copied from Mr. McAnnely's reports at Fort Collins by me on April 26th, 1929, and which table was entered as Defendant's Exhibit H-2 by Mr. Stimson. It should be noted that there are four extensions in the rating table made for gauge heighths 3.1, 3.2, 3.3 and 3.4 feet. These extensions were made by me on logarithmic paper.

Mr. Greenwood: Complainant now offers its Exhibit No. 95 and asks that it be received as evidence in the record.

Mr. Howell: The defense objects to the introduction of Complainant's Exhibit No. 95 for the reason that it is misleading and leaves an impression which is not according to the facts as shown by the evidence heretofore intro-

duced—namely, it purports to be a comparison or computation based upon Mr. McAnnely's rating table of 1922, while the evidence heretofore in the record discloses that McAnnely's rating table was computed only to a gauge heighth reading figure of 2.6, while the table that appears in Complainant's Exhibit No. 95 leaves the erroneous impression that McAnnely's table continued on to a gauge heighth reading of 2.7, 2.8, 2.9 and 3 feet.

We object for the further reason that while the Complainant's Exhibit No. 95 purports to be based upon Me-
[fol. 1276] Annely's rating table of 1922, as a matter of fact, as shown by the evidence heretofore introduced, McAnnely's rating table does extend and cover (2057) the gauge heighth readings 3.1, 3.2, 3.3 and 3.4, and that each and all of these figures as he referred to are computations only of the witness R. I. Meeker, and are not based in any way upon gauge heighth readings as shown by Mr. McAnnely's rating table of 1922.

For the further reason that said Exhibit No. 95 does not fairly present the condition that actually existed and is shown by the proper computations based upon Mr. McAnnelly's table of 1922.

As to whether Complainant's Exhibit No. 95 was made on the same basis and with reference to the same depth as the figures used by Mr. McAnnely, referring to my original table, copied on May 26th, 1929, at Fort Collins, in Mr. McAnnely's office, I find my rating table extends to 3.0 on the gauge, with a discharge of 117.5 second feet, and the only extensions which have been made in the rating table shown on Complainant's Exhibit No. 95 are above the gauge heighth of three feet, and are so indicated as extensions "by Meeker".

Mr. Howell: We renew our objection, as heretofore stated, to the introduction of Complainant's Exhibit No. 95.

(Complainant's Exhibit No. 96 marked for identification.)

(The 1922 McAnnely rating table of the Sand Creek Ditch, as taken from Exhibit No. 95 are plotted on logarithmic cross-sectioned paper.)

Complainant's Exhibit No. 96 is the 1922 McAnnely rating table of the Sand Creek Ditch, as taken from Exhibit

No. 95 and plotted (2058) on logarithmic cross-sectioned paper. In addition, the current meter measurements tabulated on Complainant's Exhibit No. 95 are plotted, at their proper positions against the curve, to show the deviations from the rating curve which has been used for twelve [fol. 1277] years. The right hand vertical scale gives gauge heighths in inches and foot. The horizontal scale at the bottom is graduated in second feet. The logarithmic paper has been used because, ordinarily, canal discharge clearances plot as a straight line upon logarithmic cross-section paper, and a curve extension is more easily made with a straight line than with a discharge curve on ordinary cross-section paper. Complainant's Exhibit No. 96 shows graphically the tabular data contained on Complainant's Exhibit No. 95.

This exhibit shows variations in discharge between the meter measurements and the McAnnely rating table for 1922. In 1929 the rating table showed discharges at low stages at twenty per cent in excess of the measured discharges. In 1931 the rating table values on one check meter measurement of twenty second feet, was seventeen per cent low. In 1933, on one check meter measurement of 44 second feet, the rating table was about eight per cent low. In 1933 the rating table ranges from one per cent to twelve per cent lower than the measured discharges.

Mr. Greenwood: Complainant now offers its Exhibit No. 96 in evidence, and asks that it be received as evidence in the record.

Mr. Howell: The defendant enters the same objection as heretofore entered, to the introduction of Complainant's Exhibit No. 95, to the introduction and reception of Complainant's Exhibit No. 96.

(2059) I have familiarized myself with the testimony of the witness Mr. Tipton, testifying on behalf of the State of Colorado in this case, with reference to the water supply of the Laramie River and with special reference to what he calls the close relation of the run-off of the Cache la Poudre River at the Laramie River, and have, in connection with that study of Mr. Tipton's testimony, examined Defendant's Exhibit T-3, with reference to columns 6 and 7 in that exhibit, being a table which shows the basis [fol. 1278] for the statement by the witness Tipton that

there is a close relation between the low periods on the stream flow of 1925 and 1932 on the Cache la Poudre River and on the Laramie River.

With reference to the attempted correlation by this witness of the flow between the Cache la Poudre River and the Laramie River, as shown in columns 6 and 7 of Defendant's Exhibit T-3, I found that in column 6, yearly values of depleted Laramie River flow were used, while in column 7, a seven months period of April to October, natural flow on the Poudre River was used. By "depleted Laramie River flow", I refer to the recorded flow 1911-1932 at Woods Station, which is partly depleted by the trans-mountain ditch diversions, and, in column 4, again depleted by witness Tipton to future conditions. Column 5, then, is residue flows, not natural flows, and the per cents in column 6 are artificial or fictitious. Column 7 of Exhibit T-3 is taken from column 10 of Defendant's Exhibit P-3, and the per cents in column 10 are derived from April to October flows of the Poudre River by applying (2060) the 1884-1932 mean of 299,112 acre feet to the April to October values in column 9.

By that method of comparison, values are compared that are not comparable, in one instance, the natural flow, and, in the other instance, the depleted flow. The procedure used by Mr. Tipton leads to erroneous per cents, and the use thereof to false conclusions. An effort is made to correlate the low water flow of two rivers by using the natural flow on the Poudre River for seven months, with per cents determined from a forty-nine year mean, 1884-1932, and using the depleted flow of the Laramie River full year periods with per cents determined by use of an artificial mean for twenty-two years, namely, 1911-1932.

For a correct correlation of the flow of two rivers, natural flows of the stream should be used; also, like periods of [fol. 1279] time, namely, twelve months per year, and the mean yearly flows used to determine the yearly per cents, should be based on the same period of years—in this instance, twenty-two years, namely, 1911-1932, the periods of records under consideration. When this procedure is followed on the two streams, the eight year mean, 1925-1932, on the Poudre River becomes eighty-eight per cent of the twenty-two year mean of 1911-1932, and, on the Laramie River, also using natural flow, the eight year mean, 1925-

1932, becomes ninety-five per cent of the twenty-two year mean of 1911-1932. In other words, during the eight year low period of 1925-1932, the Poudre River runoff averaged but eighty-eight per cent of the twenty-two year mean of 1911-1932, whereas on the Laramie River the actual water production was ninety-five per cent of the seventy-(2061) two year mean of 1911-1932.

When proper study and comparison is made, there certainly is no close relation of flow in these figures, one stream being 12 per cent below normal, and the other but 5 per cent below normal. The declining flow at Woods Station during the 1925-1932 year period is primarily due to increased trans-mountain diversions by Colorado ditches to the Poudre River Basin.

If further proof of non-correlation of flow is required between the Poudre River and the Laramie River, a comparison of the natural flow of the individual years of the twenty-two year period of 1911-1932 discloses a wide variation in flow between the two streams from year to year. In fourteen years of the twenty-two year period the yearly flow per cents on the Poudre River were less than on the Laramie River, the per cent variations ranging from minus 3 per cent to minus 26 per cent. In the eight years when the Poudre River yearly per cents were greater than those of the Laramie River, the yearly per cent variations ranged from 6 per cent to 47 per cent.

In 1925, the Laramie River water production was 74 per cent of the twenty-two year mean:; in 1925, the Poudre [fol. 1280] River water production was 67 per cent of the twenty-two year average. In 1926, the Laramie River water production was 117 per cent of its twenty-two year mean, and in 1926, the Poudre River water production was 129 per cent of its twenty-two year mean. In 1927, the Laramie River water production was 95 per cent of its twenty-two year mean, and in 1927, the Poudre River water production was 82 per cent of its twenty-two year mean. In 1928, the Laramie River water production was 118 per cent (2062) of its twenty-two year mean, and in 1928, the Poudre water production was 105 per cent of its twenty-two year mean. These are my own figures and study.

In 1929, the Laramie water production was 123 per cent of its twenty-two year mean, and in 1929, the Poudre River water production was 111 per cent of its twenty-two year

mean. In 1930, the Laramie water production was 78 per cent of its twenty-two year mean, and in 1930, the Poudre water production was 73 per cent of its twenty-two year mean. In 1931, the Laramie water production was 54 per cent of its twenty-two year mean, and in 1931, the Poudre water production was 57 per cent of its twenty-two year mean. In 1932, the Laramie River water production was 100 per cent of its twenty-two year mean, and in 1932, the Poudre water production was 79 per cent of its twenty-two year mean.

The wide variations in flow are due to the Poudre River Basin being located on the east slope of the mountains, while the Laramie River Basin is located on the west slope of the same range. Seldom do stream flows of the eastern slope correlate closely year by year with stream flows of the western slope. In extremely dry years, there is usually a correlation, and in extremely wet years, there may or may not be.

(2063) After careful study, I find that Colorado's Exhibit T-3 does not disclose the relation or correlation of flow of these two rivers. As to what period of time I have particu- [fol. 1281] larly studied it, generally, the period of 1911-1932, and, specifically, from 1925 to 1932. Colorado's Exhibit T-3 does not correctly show the relation between the water production of the Poudre River and Laramie River for the eight year period of 1925-1932. When the proper procedure is used in analyzing and comparing the natural flows of the two streams for the eight year period of 1925-1932, there is a wide variation. I mean by the "proper procedure," using the natural flow of both streams over the same period of time, and also, like periods of time.

Complainant's Exhibit No. 88 is a photograph of the improved Venturi flume at the east portal of the Laramie-Poudre Tunnel, showing conditions of flow on July 5th, 1932, with a discharge of close to 36 second feet, when M. C. Hinderlider, R. L. Parshall and John E. Field made three check current meter measurements. The view is looking down stream, and the picture was taken by Mr. Parshall. The photograph, Exhibit No. 88, was identified by Mr. Hinderlider at the Denver hearing.

(Complainant's Exhibit No. 88 offered in evidence.)

Complainant's Exhibit No. 89 is the original field notes (2064) of a check current meter measurement made on

July 5th, 1932, at the improved Venturi flume, east portal of the Laramie-Poudre Tunnel, by M. C. Hinderlider, with a mean gauge heighth of 1.15 feet, and a discharge of 36.52 second feet. The computations at the bottom of the sheet are the ones used, since the upper computations were only temporary in character—the rating table from Mr. Field's meter being used. This Exhibit No. 89 was identified by Mr. Hinderlider at the Denver hearing. There are two separate computations on that exhibit; we are using the lower one.

(Complainant's Exhibit No. 89 offered in evidence.)

Complainant's Exhibit No. 90 is a copy of a letter of date October 5th, 1928, from State Engineer M. C. Hinderlider to Miss Agnes Zimmerman, Home, Colorado, transmitting a blue print copy of the original field notes of a check current meter measurement at the improved Venturi flume, at [fol. 1282] the east portal of the Laramie-Poudre Tunnel, made on September 26th, 1928, by Bailey, chief hydrographer of the State Engineer's Office, Denver. The gauge heighth is 0.565, and the discharge, (2065) 11.86 second feet. Mr. Hinderlider also identified this Exhibit No. 90 at the Denver hearing.

(Complainant's Exhibit No. 90 offered in evidence.)

Mr. Howell: We object to the introduction of Complainant's Exhibit No. 90, for the reason that it purports to be a letter written by the State Engineer of Colorado to a party who is not a party to this suit, and could not bind the defendant in this case in any way, and it does not purport to be an official document or record of the State Engineer's office, and, therefore, is incompetent, irrelevant and immaterial.

Mr. Greenwood: In reply to the objection, I will state that the record discloses a stipulation to the effect that the exhibit, composed of the blue print copy of the field notes and the letter, are copies of the originals in the hands of, or in the office of the State Engineer of the State of Colorado, and the exhibit refers to the measurements of water discharged from the tunnel taking water from the Laramie River into the Poudre River, and with special reference to the accuracy of the measuring devices to correctly record the amount of water diverted by means of the device at the east portal of the Laramie-Poudre Tunnel.

Witness (Reading letter, Complainant's Exhibit No. 90):

(2066) "State of Colorado,

Engineering Department,

Denver

M. C. Hinderlider, State Engineer; C. C. Hezmalhalch, Deputy; J. Harold Baily, Chief Hydrographer.

October 5th, 1928.

[fol. 1283] Subject: Greeley-Poudre Tunnel

Miss Agnes Zimmerman, Home, Colorado.

DEAR MISS ZIMMERMAN:

Your letter of September 30th, addressed to Mr. Baily, requesting information on the Venturi Flume at the outlet of Greeley-Poudre Tunnel, has been referred to the writer for reply.

The flume in question was not installed by the writer; but was constructed under the supervision of Mr. Parshall of the Department of Irrigation Investigations. It is a 6 ft. timber structure placed within the section of the lower end of the concrete flume below the outlet of the tunnel.

Soon after installation, this flume was carefully checked and rated by Mr. Parshall and his assistant Mr. Rohwer, at which time a new gage was installed for checking the automatic register. Mr. Parshall immediately advised me of the results of his measurements, which seemed to check quite closely with the standard Venturi tables, copy of which you doubtless have. Based upon this information, the Water Commissioner was directed to use such tables in determining the amount of water discharged by the Tunnel.

(2067) There appears to be considerable variance between Mr. Baily's measurement of September 26th, when he found 11.86 sec. ft., and the standard rating tables. This discharge is for a gage height of 0.57. As a result of this measurement by Mr. Baily, I immediately called up Mr. Rohwer, assistant to Mr. Parshall, and asked him to make further investigations, which he did on the 5th inst., and reports the following:

For a gage height of 0.575, a discharge of 9.85 second [fol. 1284] ft. For this same gage height, the Venturi flume tables give a discharge of 9.93 sec. ft., which is practically a check.

We questioned Mr. Baily on the accuracy of his work, and he is unable to understand the reason for the discrepancy between his measurement and the result of Mr. Rohwer's. Due to the fact that Mr. Rohwer was instructed by me to use particular care, and had an engineer's level for checking the soundings and gage readings, I would be inclined to accept his results.

Very truly yours, M. C. Hinderlider, State Engineer.

MCH/bc."

Defendant's Exhibit H-1 is a table of current meter gaugings made on six-foot Parshall measuring flume at the east portal of the Laramie-Poudre Tunnel, Irrigation Investigations, Bureau of Agricultural Engineering, Colorado Experiment Station, cooperating. (2068) This table was prepared by Mr. Parshall and furnished the State Engineer's office at Denver. Accompanying the table was a one-page typewritten memorandum concerning current meter gaugings made on the six-foot Parshall measuring flume, and also, a picture taken by Mr. Parshall of the flume on July 5th, 1932, which has been entered herein as Complainant's Exhibit No. 88.

(Complainant's Exhibit No. 97 marked for identification.)

(Copy of memorandum by R. L. Parshall concerning current meter gaugings made on the Parshall measuring flume at the east portal of the Laramie-Poudre Tunnel.)

Complainant's Exhibit No. 97 is a copy of the memorandum transmitted by Mr. Parshall with this table of check current meter measurements, Defendant's Exhibit H-1, and at the same time he transmitted the photograph, Complain- [fol. 1285] ant's Exhibit No. 88. It bears the signature of R. H. Parshall, who testified as a witness in this case for the defendant, State of Colorado. He is also the Parshall referred to as the inventor of what is known as the Parshall Improved Venturi Flume.

That memorandum refers to the flume installed at the east portal of the Laramie-Poudre Tunnel under the direction

of Mr. Parshall. (2069) I know the signature of Mr. Parshall, from previous correspondence with him.

(Complainant's Exhibit No. 97 offered in evidence.)

Mr. Howell: Was this memorandum you refer to, Mr. Meeker, addressed to you?

The Witness: It was transmitted to me.

Mr. Howell: Was it addressed to you?

The Witness: Yes.

Mr. Howell: By whom?

The Witness: By Mr. McLaughlin. No, the memorandum itself is not addressed to me; the memorandum was transmitted in the letter addressed to me by Mr. McLaughlin, the chief of the department at Berkeley, California.

Mr. Greenwood: I object to the cross-examination of the witness, as to this memorandum at this time and move that the same be stricken out.

Mr. Howell: We have a right to examine the witness with respect to the offering of this exhibit, in order to obtain information upon which to base an objection, if we desire to make it.

Mr. Kelly: We have no objection to the exhibit. State the date of the memorandum.

(2070) The Witness: That was prepared and delivered April 14th 1933.

[fol. 1286] Mr. Kelly: I was asking the date this letter was written, which you are able to read. You gave the date that this man McLaughlin transmitted this report to you.

The Witness: Yes, it was in April.

Mr. Kelly: What I was trying to ascertain was the date the writer of that paper wrote it.

The Witness: In April, 1933; I am unable to give the exact date.

Mr. Kelly: I understood you to say it was attached to a letter.

The Witness: Yes, that is dated April 14th; that is the date of transmittal of the letter which transmitted the memorandum.

Mr. Kelly: But what is the date the memorandum was sent by Parshall to the State Engineer of Colorado?

The Witness: It has no date on it.

Mr. Kelly: Do you know when it was written?

The Witness: In April, 1933. (Reading:)

"Complainant's Exhibit No. 97

Memorandum Concerning Current Meter Gagings Made on the 6-foot Parshall Measuring Flume at East Portal of Laramie-Poudre Watershed.

This structure was built early in the spring of 1927 for the purpose of measuring the water diverted from the Laramie River through this tunnel in the Poudre watershed. The ordinary rectangular rating flume formerly used was (2071) found to be impractical because of the debris from the tunnel lodging on the floor of the flume. This trouble still persists.

Appended is a tabulation showing the results of eight current meter ratings made on this 6-foot Parshall measuring flume at the tunnel during the period 1927-1932. It will be noted that the percentage of deviation is considerable for "some of the measurements because of deposits of rocks and boulders in the approach section of the flume, as indicated by the accompanying photograph which was made July 5, 1932, showing the current all to one side and a rock barrier which interfers with the flow. The gaging made July 5, 1932, with a measured discharge of 37.06 second feet was for the identical condition as shown in the picture, the gaging section being just upstream from H. gage. This measurement shows a wide variation in the velocity across the section. Whereas, with the gaging made July 10, 1932, for the same condition, the section chosen was about three feet upstream from the crest, this giving a somewhat better distribution of velocities. [fol. 1287]

In my opinion it is asking too much of this type of measuring device to measure within practical limits under conditions imposed here because of the debris and unbalanced velocity conditions.

(Sgd.) R. L. Parshall."

(2072) (Complainant's Exhibit No. 98 marked for identification.)

(Comparative table of check current meter measurements at the Improved Venturi Flume at the Laramie-Poudre Tunnel for the years 1927 to 1933, inclusive, prepared by R. I. Meeker.)

Complainant's Exhibit No. 98 is a comparative table of check current meter measurements at the Improved Venturi Flume at the Laramie-Poudre Tunnel for the years

1927 to 1933. The exhibit was prepared by me and prepared to show the difference between the measured current meter discharges and the Venturi table discharges with variations in per cent.

Column 2 gives the dates; column 3, the gauge heighths in feet; column 4, the metered discharge in second feet; column 5, Venturi discharge table quantities in second feet; column 6, the differences in second feet between the metered discharge and the Venturi table discharge, with the plus or [fol. 1288] minus sign; the seventh column, the per cent variation plus or minus; the eighth column the name of the hydrographer, and column 9, the source of the data and information as shown from the exhibit or testimony in the pending case.

The study that this exhibit represents and the comparative (2073) compilations therein, show a wide variation in meter discharge when compared with the Venturi tabls discharge. In 1928, there was one disagreement of twenty-five per cent between the metered discharge and the Venturi table discharge, the Venturi table being low twenty-five per cent on a 12 second foot discharge. In 1929 all meter measurements, six of them, indicated the Venturi table discharges were too low, being from minus 3 per cent to minus 25 per cent. In 1930, the Venturi table discharges ranged from minus 8 per cent to plus 8 per cent, when compared against the base meter measurements. There was one exception to this statement.

No check meter measurements were made in 1931. In 1932, nine meter measurements were made. Five check measurements showed the Venturi tables to be low, namely, from minus 6 per cent to plus 18 per cent. It should be noted that three outstanding engineers used their combined efforts and experience in making three check meter measurements on July 5th, 1932, on discharges ranging from 35 to 37 second feet. The three meter measurements checked and confirmed each other and plainly show the Venturi tables give discharges too low, under conditions then obtaining, namely, from minus 18 per cent to minus 15 per cent. The predominant trend of all check meter measurements demonstrates that the Venturi table discharges are low, under conditions obtaining at the Laramie-Poudre Tunnel installation.

(Complainant's Exhibit No. 98 offered in evidence.)

Mr. Kelly: We object to the reception in evidence of Exhibit No. 98 for the reason that it includes and purports [fol. 1289] to state as evidence, measurements at the east portal of the (2074) tunnel at the Venturi flume, not shown to have been made there, and not heretofore proven. There is one purported measurement of July 17th, 1929, by Goyne Drummond, and another one purporting to have been made in July, 1922, at the west portal of the tunnel and not of the east portal, and containing at the bottom, argument not properly a part of the exhibit, and it, therefore, is misleading and not accurate and not properly based upon the testimony of the witness, and we move that the testimony based thereon be stricken.

Mr. Greenwood: In reply to the objections by Mr. Kelly, particularly with reference to containing meter measurement by Drummond at the east portal of the tunnel, not previously referred to in the record, I will state that the witness, Goyne Drummond, was called in behalf of the Complainant and testified in this case as having made that meter measurement on July 17th, 1929, and the official record disclosing the data showing that measurement was identified and received in the record this morning.

Mr. Kelly: Of course, our objection to that is also to the effect that it includes the objection to Goyne Drummond's measurement as not being an official record and as only hearsay, and not supported or explained by the witness.

(Complainant's Exhibit No. 99 marked for identification.)

(Discharge curve for the Improved Venturi Flume at the east portal of the Laramie-Poudre Tunnel, plotted by R. I. Meeker on logarithmic cross-section paper.)

Complainant's Exhibit No. 99 was prepared by me and is the discharge curve for the Improved six foot Laramie-Poudre Tunnel (2075) Venturi flume, at the east approach, or east portal, which has been plotted on logarithmic cross-section paper. The curve is plotted from data [fol. 1290] contained in Complainant's Exhibit No. 56, the published Venturi table discharges of the State Engineer's Office, at Denver, Colorado.

The check current meter measurements found on this Exhibit No. 99 are plotted in their proper locations and against the curve, or the straight line relation there. The

logarithmic cross-section paper is used to delineate the curve for the reason that disagreements between a straight line and plotted meter measurements can be more readily compared and studied than a curved line discharge curve.

The object of this exhibit is to show graphically the relation between the check meter measurements found on Complainant's Exhibit No. 98 and the Venturi discharge tables used at the Laramie-Poudre Tunnel installation.

As to the two special notations indicated on Exhibit No. 99 by arrows, referring to conditions at the flume on July 11th, 1929, and July 5th, 1932, photographs were taken on the dates in question, and have been entered as exhibits, and show conditions resulting from rock debris deposits in the converging section of the flume and in the approach channel at the time of the measurements to which the arrows point, showing conditions as to the heavy grade of the water as it approaches and enters the flume, and also the unbalanced velocity conditions due to the main current being deflected to either side of the flume by rock deposits in the flume proper, and in the approach channel.

(2076) Complainant's Exhibit No. 57, which applies to the Meeker-Drummond meter measurements of July 11th, 1929, was taken by me. Complainants' Exhibit No. 88, which applies to three current meter measurements made by Hinderlider Parshall and Field on July 5th, 1932, was taken by Mr. Parshall.

(Complainant's Exhibit No. 99 offered in evidence.)

Mr. Kelly: We make the same objections to Complainant's Exhibit No. 99 which we made to Exhibit No. 98, on which Exhibit No. 99 appears to be based, in that it purports to contain measurements not properly here proven, including the purported measurement by Drummond in [fol. 1291] July, 1929, and a purported measurement at the east portal in July, 1932, and a purported measurement of July, 1929, which was shown by the State Engineer to be wrong, and, therefore, it is based upon hearsay and not upon facts proven in the record. We also move that the testimony of the witness as a conclusion based upon this exhibit, should be stricken as not based upon any evidence in the record or facts that are there proven.

I made an observation or study with reference to the velocity of flow of the water passing through the Venturi

flume and in the approach channel at the east portal of the Laramie-Poudre Tunnel on June 24th, 1933, and Mr. Whiting assisted me. As to the quantity of water passing through the flume at that time, I am unable to give the exact discharge based upon the meter measurement. We were at the flume three hours and the approximate discharge ranged from 80 to 70 second feet, according to the Venturi tables. The staff gauge in the stillwell (2077) at the automatic gauge, registered 2.11 feet at 8:45 a. m., at the flume, and 1.95 feet at 11:15 a. m.

As to the conditions prevailing at the flume at the time of this study on June 24th, 1933, as to whether there was rock debris in the approach channel and in the Venturi flume, or in either of them, the so-called stilling pool above the right angle turn was over half clogged with gravel and rock deposits at the left side, confining the flowing water to a narrow, deep channel, with excessive grade, along the concrete wall to the right. In the concrete approach channel to the Venturi flume, a large rock bar had formed along the right side of the channel and extended for a distance of twenty-two feet, deflecting the flowing water chiefly along the left side of the approach channel. This rock bar extended ten feet down into the converging section of the wooden portion of the Venturi flume to a point six feet above the throat of the flume and just above the enamelled staff gauge on the right side. The rock bar obstructed one-
[fol. 1292] half of the cross-sectional waterway in the converging section of the Venturi flume. The rock debris varied from small cobbles to rocks six to ten inches in diameter.

I made velocity observations on June 24th, 1933, at six points between the tunnel mouth and the Venturi throat, and found the following surface velocities—or, if not surface, they will be otherwise designated: at the left side of the tunnel outlet, as water emerges from the tunnel, one-third width of the channel near surface, 8.70 feet (2078) per second. That is the velocity in feet per second.

At the left side of the center of the main current, just above the right angle turn, at a point about one-third of the width of the water channel and near the surface, 5.10 feet per second. Another observation at the left side of the main current, opposite the offset in the concrete wall on the right side and below the right angle turn, at a point one-

third of the width of the channel near the surface, 3.80 feet per second.

Again, an observation in the main current along the left side of the channel, at the upper end of the Venturi flume, two feet from the left side, depth of water 2.4 feet, with 0.6 velocity observation. Only half of the channel at this point is active due to the rock debris bar. The velocity was 5.90 feet per second. At the main current along the left side of the Venturi flume, 1.5 feet above the crest, at 0.6 depth, velocity observation 7.20 feet per second. I also took a velocity observation on the right side of the Venturi near the wall, 1.3 feet above the crest. This observation was both by the two-tenths and eight-tenths method, with a mean, giving 4.90 feet per second as the velocity.

The importance of the last two velocities is to show the unbalanced or non-uniform flow of water through the throat of the flume. For example, on the left side of the flume, the velocity at 0.6 depth was 7.20 feet per second, and on the right side, 4.90 feet per second, a difference of 2.3 feet per second between the velocities in the flume at the throat; and [fol. 1293] those velocity observations were obtained at practically the same time, starting up at the portal and working down, and using a (2079) current meter. They were all made within fifteen minutes.

(Complainant's Exhibit No. 100 marked for identification.)

(Six photographs showing flow conditions at the Improved Venturi flume of the Laramie-Poudre Tunnel taken by R. I. Meeker on June 24th, 1933.)

Complainant's Exhibit No. 100 consists of a series of six photographs taken by me at the time I was making this study on June 24th, 1933, with the caption "flow conditions at Improved Venturi Flume, diversion quantities approximately 80 to 70 second feet, by R. I. Meeker, June 24th, 1933."

The photographs are six in number, numbered from 1 to 6, and are arranged progressively in order down stream to show the conditions in sequence. No. 1 shows the water emerging from the tunnel; No. 2 shows the right angle turn and the gravel and rock bar in the so-called stilling pool; No. 3 shows the outlet channel between the tunnel outlet and the upper end of the Venturi flume; No. 4 shows clearly the

excessive grade in the water channel between the tunnel outlet and the Venturi, and also, the rock and gravel bar which obstructs a large part of the so-called stilling pool at the left; No. 5 is a close view of the turbulent water as it enters the approach channel to the Venturi flume, and the location of the rock bar on the right side of the approach channel (2080) and in the flume; No. 6 is a close view showing the turbulent condition of the water as it enters the Venturi flume, with the rock bar on the right side and the main current at the left.

(Complainant's Exhibit No. 100 offered in evidence.)

Mr. Kelly: We do not object to the exhibit, but do object to the argument of the witness concerning it.

Mr. Greenwood: As shown by the exhibit?

Mr. Kelly: We object to his descriptive testimony.

[fol. 1294] The conditions in the approach channel and in the Venturi flume on June 24th, 1933, were not favorable to the accurate measurement of water, for the following reasons: the grades in the approach channel and Venturi flume were excessive and the water turbulent; the channel in the upper end of the Venturi was constricted approximately fifty per cent, as determined by soundings. Roughly, one-half of the cross-sectional waterway, along the right side of the Venturi flume, was obstructed by a rock bar which extended down to within seven feet of the throat. A non-uniform flow of water entered the flume throat. The velocities on the two sides of the flume were unbalanced, being 7.2 feet per second on the left side of the flume, and 4.9 feet per second on the right side of the flume, at a depth of 0.6, and at a cross-section 1.5 (2081) feet above the crest at the throat. Debris conditions in the approach channel and converging section of the Venturi are constantly changing with fluctuations in the discharge of water and debris from the tunnel.

As to how I evaluate the present installation of the Improved Venturi Flume as now installed at the east portal of the Laramie-Poudre Tunnel, basing my statement upon conditions observed on field trips, on conditions shown in photographs entered as exhibits, and upon an analytical study of thirty-two current meter measurements made during the seven year period from 1907 to 1933, I am forced

to conclude that the installation is not properly located. Conditions are too adverse to expect dependable results.

Rock debris is a continuous source of trouble, changing waterway areas, both above and within the flume, changing water gradients, both above and within the flume, and causing unbalanced velocities and unduly high velocities in the upper part of the flume and at the throat of the flume. This measuring device cannot successfully combat such changing conditions, such adverse conditions, and measure water accurately.

[fol. 1295] The present installation is not satisfactory as a measuring device and does not accurately measure the water diverted from the Laramie River. Undoubtedly check tests can be made by cleaning the rock debris from the flume, whereby the device is enabled to function within practical limits, but conditions during such test periods are not representative of prevailing conditions during the diversion period, nor such as Mr. Parshall states, in Bulletin 336, Page 32, Colorado Experiment Station, Colorado Agricultural College, Fort Collins, Colorado, must be maintained to permit this measuring (2082) device to properly function.

Referring to the approach channel to the Improved Venturi flume at the east portal of the Laramie-Poudre Tunnel, as to whether the same general channel conditions which I observed on June 24th, 1933, would prevail at and following high water periods of future years if the present installation continues to be used, similar conditions did prevail in July, 1929—see Complainant's Exhibit No. 57. In July, 1932, at the time of the Hinderlider-Parshall-Field check meter measurements—see Complainant's Exhibit No. 88—rock debris is the chief source of trouble, and in future years, with the present installation, the rock debris conditions will continue to persist.

I am familiar with the inlet canal at the west portal of the Laramie-Poudre Tunnel, having examined it several times and measured water in it many times. It is about one-fourth of a mile in length from the Laramie River to the west portal. I have observed the channel flow conditions in that portion of this ditch or canal, and have made photographs of those channel conditions; I took several on June 25th, 1933.

(2083) (Complainant's Exhibit No. 101 marked for identification.)

(Three photographs of the inlet canal at the west portal of the Laramie-Poudre Tunnel taken by R. I. Meeker on June 25th, 1933, showing the channel flow conditions.)

[fol. 1296] Complainant's Exhibit No. 101 contains three photographs, numbered 1, 2 and 3, which were taken by me at the time I just testified to, as showing the condition of the channel at the west portal of the Laramie-Poudre Tunnel, between that point and the intake. As to what these photographs indicate as to the condition of the water in the canal as to whether it is in a disturbed condition, or otherwise, pictures 1 and 2 show very even conditions of flow; picture 3 shows the last three hundred feet of the inlet canal and just as it enters the west portal.

The photographs are arranged in order down stream. No. 1 shows the old stillwell house in the inlet canal and a section of the canal immediately below, where there was an old rectangular rating flume. Photograph No. 2 is in the opposite direction, from the same point that No. 1 was taken, looking down the canal to the west portal of the tunnel, and again, we have excellent conditions of flow. No. 3 shows the constriction in the rock debris cut about three or four hundred feet from the west portal. Photograph No. 1 was taken looking toward the west.

As to my statement that, from my point of view as an engineer, the Venturi flume installation, where it now is installed at the east portal of the Laramie-Poudre Tunnel, is unsatisfactory as a (2084) measuring device, there is a solution to this unsatisfactory condition whereby a Venturi flume or other proper measuring device could be installed to overcome conditions which I have testified make the east portal an unsatisfactory location.

There is an excellent location in the inlet canal, where the conditions are favorable for the measurement of water, for the installation of a rectangular, or a Venturi flume, and this can be made without much cost. Conditions in the inlet canal are favorable to the accurate measurement of water. The canal grade is uniform for long stretches, the cross-section of the waterway is regular, and no rock debris problem, with continually changing conditions such as you have at the east portal, confronts the operation of a rating

[fol. 1297] flume in the inlet canal, if properly located. Neither are there excessive grades or right angle turns in the inlet canal. In fact, a gauge installation in the canal section, without a rating flume, and occasional current meter measurements, should give results far superior to those now secured at the east portal. The cutting of a few trees along the canal bank, and the removal of some rock debris in a short constricted section of the canal just below the old twelve-foot Venturi flume, about four or five hundred feet above the west portal of the tunnel, would suffice. A measurement crew of the company is located at the west portal, and that would simplify the problem of installing a new measuring device in the inlet canal.

Variations from ten to twenty per cent in the measurement of water in canals for irrigation purposes, are not permissible in engineering practice. Those variations are too wide, and water is too (2085) valuable. The appriators on a river could rightfully object to any such wide variations from the actual quantities. Variations of from five to ten per cent would not be permissible as a general thing, although they do occur under certain conditions where the channel is shifting from silt deposition. Within the limits of practical measurements, two or three per cent variation, ordinarily, would be allowable or permissible, and not over five per cent, and, for this reason—a measuring flume is located in a permanent section, or is a permanent section, in the canal, and after a rating table has been prepared, check meter measurements, if properly made, would ordinarily fall within two to three per cent, and not over five per cent.

I visited the Laramie-Poudre Tunnel diversion works at the east portal—the flume—on April 16th, 1933. As to whether there was water being diverted from the Laramie River to the Poudre River at that time, referring to my original field notes of April 16th, 1933, I found that 3.83 second feet were being discharged through the Venturi Flume, which was water diverted from the Laramie River. [fol. 1298] I inspected the gauge house at that time to ascertain whether the automatic (2086) gauge was recording the diversion and found that it was not operating. I did not find any evidence of the discharge, then occurring from the Laramie River to the Poudre River, being meas-

ured or recorded by the automatic gauge, or any other evidence of a record being taken.

I have examined the weekly reports of the water commissioner of District 3, on file in the State Engineer's Office at Denver, for the year 1933. I observed from that examination of those reports the first date in 1933 when there is a report of water being diverted, which was on May 8th, 1933. I referred to the weekly reports from the water commissioner of District 3, on file with the State Engineer, and the first report, which is marked No. 1, was dated May 6th, and that is the first record of water being diverted by the Laramie-Poudre Tunnel in 1933.

The report was that the tunnel had diverted water for four days, namely, from May 3rd to the 6th, and the average flow was 5.7 second feet. I later referred to the reports, and they followed in sequence, Numbers 2, 3, 4, and so forth, to satisfy myself that I had the first report. They were so numbered, 1, 2, 3 and 4; so whatever water was diverted between the date of April 16th, 1933, and the first reported diversion by the chart, so far as the records I examined in the State (2087) Engineer's Office are concerned, was unreported water. There was water being diverted prior to April 16th, 1933, by the tunnel, as evidenced by the conditions I observed in the inlet canal. In other words, this 3.83 second feet did not start running, in my judgment, on the morning of April 16th, because the canal had not been cleared of snow; that amount of water was the gradual development, from a much lesser amount, up to that time.

Mr. Kelly: We object to that as argumentative, leading, repetition of testimony of the same witness on the case in chief, and not proper rebuttal, and we move that all of this line of testimony as to April 16th be stricken as not proper rebuttal.

[fol. 1299] Mr. Greenwood: It is offered for the purpose of showing, as alleged in the bill of complaint, that the devices installed for the measurement of water in transmountain diversion from the Laramie River to the Poudre River do not accurately record all of the water so diverted.

Mr. Kelly: We move to strike the answer as pure hearsay and guesswork.

Mr. Greenwood: I will state further that the testimony is offered for the purpose of showing that the defendant,

State of Colorado, does not accurately operate the installed devices for measuring water diverted from the Laramie River to the Poudre River.

(2088) Referring to Defendant's Exhibit J, being certified copy of map of the proposed Laramie tunnel ditches and feeders, by the Larimer County Reservoir and Irrigation Company, as filed in the United States Land Office, showing the right-of-way applied for and which was approved March 29th, 1909, I find, referring to the West Side Collection Canal, herein designated the Lower Supply Ditch, 4.28 miles in length, commencing at Mill Creek, and approximately opposite the tunnel line, west portal, in Section 6, Township 8 North, Range 75 West, Sixth Principal Meridian. I have given the original, oldest right-of-way location for the West Side Collection Ditch.

Referring to the map of the amended survey of the partially completed portion of the Laramie tunnel ditches and feeders, I find this map, which was approved on May 5th, 1924, by the Secretary of the Interior, shows an amended location of the West Side Collection Canal—first, the tunnel portal has been moved one mile up stream from the Northwest Quarter of Section 6, to the Southwest Quarter of Section 7, Township 8 North, Range 75 West, and the canal line, the (2089) Lower Supply Canal, or West Side Collection Canal, has been extended from Mill Creek up to the west fork of the Laramie River a distance of approximately [fol. 1300] one and a half miles.

There is a considerable difference in places between the original location and the amended location of the Lower West Side Collection Ditch, in some instances, as much as a quarter of a mile, and then, in other instances, the lines are approximately the same as to the physical location on the map. As to the elevation, the grade elevation, I cannot determine that from this exhibit. With reference to the south end of the West Side Collection Ditch, as previously indicated, the original survey terminated at Mill Creek; the amended survey extends up the valley of the Laramie River, but on a descending grade, approximately a mile and a half.

According to the exhibits, the West Side Collection Ditch, or Lower Supply Ditch, is not constructed on the identical original (2090) location. As constructed, it extends for approximately a mile and a half farther down

toward the west branch of the Laramie River than the original location called for.

Examining automatic gauge chart of the Laramie-Poudre Tunnel for the week of June 11th, 1927, which appears in the record as Defendant's Exhibit I, I find the notation on June 16th, "gauge corrected 0.16 feet, by Parshall", with an arrow pointing to the pen line at about 2:10 p. m. As to whether that notation, placed thereon by Mr. Parshall, indicates that the correction is to extend to any other chart taken from the automatic gauge register in the Laramie-Poudre Tunnel, with reference to a similar error and for the purpose of correction, from my experience on handling automatic charts, I did consider that that note applied to the chart for the week of June 11th-18th. The note is inadequate as to corrections for charts prior thereto, but, ordinarily, it is customary, if the gauge has been corrected, to clearly state that prior charts should be corrected. That correction there was really a correction of the gauge staff. The gauge staff was raised .16 of a foot, and the pen was dropped approximately .16 of a foot.

[fol. 1301] (2091) As to Mr. Parshall's testimony in this case that careful observation of that notation would have indicated a similar correction on weekly charts taken off that same register for the preceding weeks in 1927, I examined those charts for the preceding weeks in, I think it was, the month of March of the present year; there was no correction, and I think there is no such correction now. I find no specific notes on the charts prior to June 11th, 1927, and up to the time of the installation of the Venturi flume, stating that these charts should be corrected for the change in the gauge. I do find that some gauge heighths have been entered on the charts, since I first examined them, and a correction of .16 has been applied to them.

With reference to that additional information that has been entered on these charts in the way of new gauge heighth, I have talked with some one in the State Engineer's office of Colorado, where these records are kept, with reference to when that additional information was placed thereon. I reviewed these charts again in the State Engineer's office, I think it was the latter part of May, and found these changes. I asked the office force whose figures

they were, and they sent me to Mr. McGraw, one of the hydrographers. I talked with him and he said (2092) that he had done some work on these charts, I think, within a period of ten days or two weeks, or such a matter —on these and other charts, and he had entered the corrected gauge heights and computed the mean gauge charts. I believe these corrected gauge heights were placed thereon after my first examination of these records, and after my testimony with reference thereto in this case.

Mr. Howell: We object to the witness testifying to a conversation between himself and some other employe of the engineer's force. The charts have been introduced in evidence, and they speak for themselves. He testified there was a correction made there, and it appears on the chart.

Mr. Greenwood: This testimony is offered for the pur- [fol. 1302] pose of showing that this witness, in the original examination of these charts, was not careless and overlooked the notations, which the testimony of Mr. Parshall was intended to imply was there at the time of the original examination.

Mr. McGraw is a hydrographer in the State Engineer's office at Denver, an employe in the State Engineer's office.

Mr. Howell: We object further to any statement made with respect to the conversation with some employe of the State Engineer's office, for the reason that it is improper rebuttal. The charts were introduced and that was gone into (2093) by the complainant on its main case.

Mr. Greenwood: In reply to the objection, I will state that it is for the purpose of showing, as alleged in the bill of complaint, that the records kept by the State of Colorado with reference to discharge of water in the trans-mountain diversions from the Laramie River, are not accurate and are not to be relied upon; and with reference to the particular record, to which the witness just testified, that the change was made after the case was commenced and after this witness testified in chief in this case.

Cross-examination.

By Mr. William R. Kelly:

I talked with Mr. McGraw in May and found that he had worked up these automatic register charts on the Laramie-Poudre Tunnel. As I understood him, he worked up the

mean gauge heighth for each day, and then applied a correction of .16. He had made these pencil notations on the register charts some time in May, and he had originally done it on the one chart, on which the partial note was found, and then he later found there was some disagreements, and I think, got information from Mr. Parshall, as I understood it, and then was able to apply (2094) the correction back. It was all done in connection with his [fol. 1303] operation in working up the actual gauge heighths for the period prior to the 16th, and was done as a part of the same operations on, I think he said, May 11th. It did not change the pen lines any on the days prior to June 16th. I could not have done the same thing myself from the one chart; the note was adequate for the week for which it was entered by Parshall, but not adequate for the prior charts. I did not consider it so; it did not specify, except that it should be applied to prior charts.

I have heretofore testified on the case in chief regarding the present location of this West Side Collection Ditch. As to my claiming that any portion of the ditch is located any differently now from what I found it constructed in 1913, except that portion at the lower end where it goes to the west portal of the tunnel, in 1913, the construction work ended at a point opposite the old concrete conduit in the channel of the Laramie River, in the tunnel reservoir.

I introduced some photographs of the line of the ditch as (2095) I found it in 1913, and as I photographed it. That is the same line on which the ditch now runs, but not the same line as the original right-of-way map, Defendant's Exhibit J. The original map, that I referred to, I believe shows the original locations, with amendments of the constructed portions. I take it that that map was made some years prior to its actual approval, because it takes several years to get them through; and that is true of the amended, or constructed location map, the last one.

I believe the West Side Collection Ditch does use the tunnels that I saw in 1913, and as far as where the ditch commences is concerned, Station 1 on both location maps, Exhibit J, is at Rawah Creek, but the construction stakes I observed in 1913 were from the lower end of the ditch up the ditch, because I have referred to my notes and studied that particular feature.

I testified in the case in chief regarding being at the [fol. 1304] east portal of the tunnel on Easter Sunday,

1933. I believe I was at (2096) the west portal the day following, or the day prior; it was the day either just before or just after.

Referring to Complainant's Exhibit 100, photographs taken by me at the east portal of the tunnel showing some gravel or debris lodged, and particularly to the one numbered 5 where I pointed out one with an arrow and designated it "rock bar," with the changing conditions there, it is difficult to name the length of time that — had been in there; I do not feel I am competent to name the time that — had been in there, with what information I gleaned on my trip. As to whether it looked to me as if it had risen that morning, I am unable to answer that question, Mr. Kelly. I am pretty good at observing water action, but I do not think I would be warranted in going to that extremity. I would not call it a permanent condition; there is a changing condition in the approach channel and in the flume. The rock debris varies and moves with the fluctuations in the water. I think it was probably there the day before. I was there for about three hours that day; we reached there a quarter of eight in the morning.

(2097) I went to the Skyline weir that day, on the way over to the Laramie. I did not make a meter measurement of that; I was at the Skyline weir just a matter of three or four minutes, about noon—it may have been a few minutes after. That night, I stayed at Atmoore Lodge, or Glendevy postoffice. The following day, I was in the Laramie Valley until about eleven o'clock, and then I went to Sand Creek, or Divide Ditch. I did not go to the Deadman headgate.

As to whether, in developing my tables of the flow of the Laramie River and of the Little Laramie River, Exhibits 50 and 51, and the other tables and exhibits based upon those, I found that there has been any substantial change in the uses of the water on the Little Laramie River above Fillmore since 1911, I did not go up to investigate that feature. I do not think there have been any substantial changes, but I did not go up and investigate it. In making [fol. 1305] a comparison, however, with the flow on the Laramie River proper, or the Big Laramie River, I did not take into consideration any changes in the developing or (2098) increasing diversions from the Laramie River proper, because the period in question was very recent on the Laramie River for which I wanted to extend the records.

I did not make a personal investigation of the lands being irrigated in the Laramie River Valley in Colorado, above Glendevy gauging station for the years 1931, 1930, 1929 or 1928. As to my saying that in June of this year, I found one ditch above the Laramie-Poudre Tunnel, in the Laramie River Valley in Colorado, which was unnamed, I said it fitted the headgate description of the Charles E. Lanning, I think it was. I found that ditch was inactive; it was not diverting water this year. The Ben Warren Ditch was not diverting water at the time I was there this year. As to there being any hay cut this year, or in 1932, above Glendevy gauging station, there would not be any cut this year, because it is too early; I could not answer that in the affirmative for 1932.

(2100) JOHN A. WHITING, a witness recalled in behalf of complainant:

Direct examination.

By Mr. James A. Greenwood:

I am the same John A. Whiting who previously testified in this case. I visited the meadow lands of the Laramie Valley in Colorado on June 24th and 25th, 1933, in company with R. I. Meeker, a civil engineer of Denver, Colorado. That was my last trip up there; I have been there previously.

I observed upon this trip, with reference to the meadow lands, as to the existence of ditches and things generally, the Springer, Brinker Creek, Brown, Ben Warren, Link Ditch No. 1, and Lone Tree Ditch. I found the Springer Ditch, the Brinker Creek Ditch, the Brown, and Link No. 1 Ditches were diverting water on June 24th, when we visited them. The Link No. 1 Ditch and Lone Tree Ditch were diverting water on June 25th. The Ben Warren Ditch was not carrying water on the day of my visit. The water so [fol. 1306] diverted was used for irrigation purposes. The Springer (2101) Ditch, Brinker Creek Ditch, Brown Ditch and Lone Tree Ditch were diverting water to lands used for meadow or pastures, and which bore evidence of long irrigation. I did not visit the lands irrigated by the Link No. 1 Ditch. There was water being diverted by the

ditch, and Mr. Moore, the lessee of this ditch, stated that the water was being used for irrigation purposes.

I have observed Defendant's Exhibit I. It shows all of the ditches I have mentioned, excepting the Ben Warren Ditch on the west side of the Laramie River Valley, opposite Brinker Creek, and the Lone Tree Ditch, diverting water from Lone Tree Creek in Section 11, Township 10 North, Range 76 West. The map shows none of the lands on the ditches mentioned as irrigated from the Laramie River and tributaries. Assuming the acreage that Mr. Downing shows as irrigated is correct, then his map, Defendant's Exhibit I, does not correctly represent the actual conditions (2102) in the field of the ditches mentioned. The acreage irrigated by the ditches to which I have just testified as Springer, Brinker Creek, Brown, and Link No. 1, and Lone Tree, would increase the acreage he states as being under irrigation. I believe that these ditches and the appropriations of water decreed to them, are in constant use.

I last visited the Divide, or the Sand Creek Ditch, on June 25th, 1933, in company with Mr. R. I. Meeker, of Denver, Colorado. As to the amount of water I observed being diverted at that time through this ditch, the staff gauge in the rectangular flume read 1.41 feet, which, when compared with Defendant's Exhibit H-2, being McAnnely's rating table for the Divide Ditch flume, gave a discharge of 33 cubic feet per second, as being taken from Sand Creek by the Divide Ditch on June 25th, 1933. At the time of this visit, I observed the conditions of the rating flume and the ditch both above and below the rating flume, particularly as to gravel deposits.

[fol. 1307] (2103) The Divide Ditch above the flume and just below the flume contained a heavy blanket of gravel deposit; also, a gravel deposit in the upper and lower ends of the flume. There was an irregular area in the bottom of the flume practically free from gravel. It was evident that heavy gravel deposits form annually during the time of greatest diversion, not only in the flume, but above and below the flume. A large spoil bank, as well as a large ditch bank, were evidence of the amount of gravel previously deposited and removed.

Robert Gwynn, assistant caretaker of the Divide Ditch, informed us that it was necessary to remove the gravel de-

posits from the Divide Ditch and rating flume annually. He stated that the gravel deposit on the flume itself had been removed during the past two or three days previous to our visit. Its condition indicated that deposits were being built up, creating a constantly changing condition in the cross-section and the flume.

As to what effect the deposits of gravel in this Divide Ditch and in the rating flume would have on the measuring device, with reference to whether they could accurately record the water discharged under those conditions, the accuracy of a rating flume depends upon the maintenance of the conditions of the flume and adjacent canal as they prevailed at the time the flume was rated for discharge. If the channel of the canal above and below the rating flume, or the section of the rating flume itself, is constantly changing because of gravel deposits or other obstructions which change the cross-sectional area, the gradient of the ditch, or deposits, causes the staff gauge or automatic recording device to read a depth of water not the true depth at that time, the (2104) calibrations of the measuring device will not apply and a false record will be made showing a discharge other than the true discharge. The deposits of gravel in the Divide Ditch and rating flume because of changed cross-section and gradient, materially interfere with the discharge as indicated by the staff gauge or auto- [fol. 1308] matic recorder readings and the resulting discharge records are inaccurate and unreliable.

I am familiar with the territory along Sand Creek in Wyoming, and with the ranch lands that are irrigated from the creek. I do not know the ranches which Mr. Bruce Eaton testified he had purchased certain water rights of, amounting to 16 cubic feet, but I know approximately where they are located.

The diversion from the Sand Creek channel through the Eaton Ditch, being located above the point where water is diverted from Sand Creek to irrigate ranches in Wyoming, would injuriously affect these ranches by reason of the loss of this water. It would deplete the stream, and when the water was relatively short or low, it would so deplete the stream that there would be insufficient water available for irrigation above or below the ranches formerly owned by Bruce Eaton.

(2105) This would be caused because of the return flow of the ranches above would satisfy the Eaton owners to a certain extent, and the lands formerly owned by the Eatons would be available for ranches below. It would injuriously affect both irrigated lands below the ranches, from which Mr. Eaton attempted to segregate the water rights, as well as above.

I have at various times made a request on Mr. Eaton for the release of water to satisfy shortages on the Sand Creek territory below the diversion works. He has always agreed over the telephone to release some water, and some years we checked him and some years we did not, as to whether water was releasd or not. In 1932, we found the release was insufficient and made the second request, and got water released.

From my requests upon Mr. Eaton for the release of water, and from his responses thereto, I think Mr. Eaton recognized the right of the Sand Creek ranches to divert and use a portion of the Sand Creek water. He did not make any objection to the release. I requested the water [fol. 1309] released for use below the Sand Creek diversion works, in accordance with the adjudicated water rights on Sand Creek ranches in Wyoming. It would satisfy Sand Creek appropriators in Wyoming. (2106) I visited the vicinity of the Bob Creek Ditch and the Columbine Ditch on June 29th, 1933, in company with Mr. R. I. Meeker. The purpose of this visit was to examine the Columbine and Bob Creek ditches to ascertain their physical condition, to see if they were or had been in operation during the 1933 irrigation season, and what steps, if any, had been taken by the ditch owners and the State of Colorado to prevent trans-mountain diversions by these ditches. We proceeded to make an investigation or observation for that purpose.

As to what we observed with reference to the Columbine Ditch, at the time of our visit, which was on June 29th, 1933, it was running very little water. Meeker estimated it as 1/50th of a cubic foot; I would describe it as a mere trickle. There was no automatic recorder in operation. We followed up the ditch, finding occasionally a big snow drift, but no water running away from the same. The ditch was dry, except for a few small puddles of water.

The waste ways of the ditch were open. Boards had been nailed over the upper end of the covered section, which is

located at the lower end of Columbine Ditch. These boards were used to close this section to prevent snow blowing in during the winter months. It would (2107) appear that they had, by this means, closed this portion of the ditch temporarily against the passage of any large quantity of water, thus forcing it out the waste way a short distance above the upper end of covered section of ditch. To insure Wyoming against diversion of water by Colorado, an earthen dam should be constructed across the ditch immediately above the covered section of the canal.

From the outlet of the Columbine Ditch, we walked up the ditch bank. The ditch, for the most part, was free of snow [fol. 1310] and dry except where it intercepts the two branches of Deadman Creek. The first stream intercepted by Columbine Ditch was flowing approximately one and one-half cubic feet of water per second. This water flowed into and down the ditch for a distance of approximately three hundred feet to a waste-way where it left the ditch and returned to the stream.

The Deadman branch above the one heretofore mentioned, was contributing about one cubic foot of water per second of time to the ditch. This water was escaping back to the stream through a waste-way located a short distance below the point of diversion or inflow. The Columbine Ditch had the appearance of not having been used during the present season, the surprising thing of the whole trip being the absence of water running into the ditch from the snow banks above. A careful examination of the upper banks of the canal would indicate the absence of any appreciable runoff into the ditch, except at the points where the ditch covers natural streams.

We made a similar observation of Bob Creek. We observed (2108) that no efforts had been made to prevent the diversion of water by Bob Creek other than opening the spillways and fastening boards over the inlet of the covered ditch sections, which is the customary preparation for winter months. The south feeder canal of Bob Creek does not have a waste-way for discharging the waters collected by that ditch. All water entering south feeder canal, until of sufficient depth to overflow banks, cannot escape and flows into Bob Creek Ditch and thence through covered section into Poudre River drainage.

As to what conditions we found pertaining to water from diversions by Bob Creek during the year 1933, as a result of our visit, following the phone line, we walked from the Columbine Ditch to the Bob Creek Ditch, and thence down said ditch to its outlet. We found a few small streams discharging water into the ditch. The water thus diverted was escaping through waste-ways back to the stream. The ditch was discharging not in excess of one-fifth of a cubic foot of [fol. 1311] water per second on June 29th, 1933. The lower end of the Bob Creek Ditch is a covered section in cut—very similar to the lower end of the Columbine Ditch. The entrance to the covered section of the Bob Creek Ditch had been boarded up to prevent snow drifting in during the winter months; however, three of the boards were loose. Two of these boards, which were vertical, were fastened by one nail at the upper end and swinging loose at the bottom; the third board was loosely resting against the others. (2109) This arrangement for closing the covered section of the ditch to snow was apparently not effective as against preventing the flow of such water as might enter the main canal or south feeder ditch below all spillways. In fact, the boards were so hanging as to leave openings between the boards.

The condition of the Columbine and south feeder ditches would indicate that little or no effort had been made to prevent the flow of such water as might enter the ditch or feeder and reach the covered ditch section from running into the Cache la Poudre drainage. The water marks on the sides of the Bob Creek Ditch, both above and below the covered section, would indicate that some water had been diverted during the 1933 season.

The south feeder ditch is now in condition to divert and deliver to the entrance of the covered section of the Bob Creek Ditch, a considerable quantity of water, estimated at from eight to ten cubic feet per second. With a small amount of repair work, this ditch would be able to divert a much larger quantity.

To insure a complete cessation of diversions by the Bob Creek Ditch and south feeder ditch, an earth dam should be constructed at or below the junction of the two ditches and opening provided through the present ditch banks above the junction to prevent the release into the Laramie River

drainage of all waters finding their way into Bob Creek Ditch and south feeder ditch.

[fol. 1312] We took photographs, which I have here, to picture these conditions we observed there.

(2110) (Complainant's Exhibit No. 102 marked for identification.)

(Four photographs taken by R. I. Meeker on June 29th, 1933, of the Columbine, Bob Creek and South Feeder Ditches.)

Photograph marked 1 on the back, of Complainant's Exhibit 102, is a picture of the entrance to the covered section of the Columbine Ditch, as observed on June 29th, 1933. It shows the boards over the entrance of the covered section of this ditch to keep out the snow. Photograph No. 2, on the back, is a picture of the entrance to the covered section of the Bob Creek Ditch, the photo being taken June 29th, 1933. It shows the boards, the condition of the boards, at the upper end of the covered section, and the opening between the boards which would permit water to pass through the covered section into the Cache la Poudre drainage. The water mark on the ditch bank on the left hand side would indicate that during the present irrigation season, some water has been passing in that ditch.

It shows the water mark there, which is fresh, probably down to a depth of fifteen or eighteen inches of water in the ditch. Photograph marked 3 on the back is looking down the south feeder ditch, toward the junction with the Bob Creek Ditch. This ditch has an original embankment, and then to the left is a second embankment which has been built in comparatively recent years. The original ditch, with its old (2111) embankment, will carry about an additional foot of water in depth than what was in it on the day of our visit on June 29th, and it is estimated that its carrying capacity would be from eight to ten cubic feet per second. Photograph 4 is a picture of the Bob Creek Ditch from the log house over the measuring flume. The channel and banks show erosion of loose dirt near the toe of the slope. This would indicate there has been a considerable head of water in the ditch some time during the present season.

[fol. 1313] Those photographs were taken by Mr. Meeker, who accompanied me to the Columbine and Bob Creek Ditch on June 29th, 1933.

(Complainant's Exhibit No. 102 offered in evidence.)

I last visited the east portal of the Laramie-Poudre Tunnel on June 24th, 1933, with R. I. Meeker, consulting engineer of Denver, Colorado. We visited both portals on that day; we visited the east portal first and later on, the west portal. At the time of our visit, we observed the conditions existing in the canal at the east and west portal with reference to the flow of water and the measuring devices.

We arrived at the east portal of the Laramie-Poudre (2112) Tunnel at 8:45 a. m. on June 24th. The staff gauge in the stillwell of the Improved Venturi or Parshall flume read 2.11 feet and the chart record read 2.18 feet, a difference of 0.07 feet. According to the Colorado State Engineer's table for discharge through an Improved Venturi flume, the gauge readings would indicate approximately eighty cubic feet per second discharge at that time.

We observed evidence of debris in the outlet structure and in the flume. There was an island of debris in what has been described as the stilling pool of the outlet structure. The debris was located to the left and below the tunnel outlet. There was also a deposit of debris in the concrete approach channel to the Venturi flume and in the converging section of the said flume. This debris was deposited on the right side of the concrete approach channel beginning a short distance below the inlet to the said channel and extending into the converging wooden section of the flume to within two (2) feet of the flume staff gauge. The deposit from the upper end gradually widened or extended to the left into the channel until at the upper end of the wooden converging section of the flume, it ex- [fol. 1314] tended about half way across the channel. From this point, it gradually narrowed toward the right side of the converging section of the flume and ended, as heretofore stated, about two feet above the staff gauge on the right side of the flume.

(2113) Photographs numbered 2, 3, 4, 5 and 6 of Complainant's Exhibit No. 100, show the deposit of the debris to which I just testified. As to what effect was noticeable as to the deflection of the current in the channel of the

flume because of the presence of this debris, the water flowing from the tunnel was confined by this debris to a channel along the south or right wall of the outlet structure. Upon reaching the east wall, it was deflected and flowed along the east wall of the outlet structure until it encountered the debris in the approach channel and flume which deflected the current to the left side of the wooden converging section and throat of the flume. The change or deflection of this current from the right side of the approach channel to the left side of the flume, created a high velocity of water along the left side of the flume and a relatively still body of water in the right half of the flume, below the deposit of the debris.

The presence of these deposits of debris, causing the deflection of the current, would greatly affect the accuracy of the measurement of water passing through the flume. The Improved Venturi or Parshall flume is a device which, when properly installed in a suitable location, will measure the discharge of water without special rating, because it has been calibrated and rated in the experimental laboratory. Its accuracy must, therefore, depend upon its installation under conditions that are similar to those under which it was calibrated, which are uniform velocity of approach to and through the converging section of the flume with the resulting uniform velocity for any gauge height for similar depth of water on the crest of the flume.

The conditions surrounding the installation of the Im- [fol. 1315] (2114) proved Venturi or Parshall flume at the east portal of the Laramie-Poudre Tunnel, are such as to preclude its measuring the discharge of water from the tunnel within practical limits, because of the unbalanced velocity conditions caused by debris deposits and the steep gradient through the approach channel. I agree with the opinion stated by Mr. Parshall, that the burden imposed on the flume at this point is too great for accurate results.

Mr. Meeker and I made some current meter measurements for velocity. In order to check the Venturi flume for unbalanced velocities, measurements of the velocities were made with a current meter on June 24th, 1933, by Meeker and Whiting. Meeker operated the meter, and I recorded the notes. The following velocities of the water

at several points from the tunnel outlet to the crest of the Improved Venturi flume were obtained.

Mr. Meeker has heretofore testified to these velocities, which varied from 8.68 at the mouth of the tunnel, to 3.77 about half way between the mouth of the tunnel and the Venturi flume. At about a foot and a half above the crest of the Venturi flume, we found a velocity on the left side of 7.23. These figures would indicate a gradual decrease in the velocity of the water from the tunnel outlet to a point above the entrance to the approach channel, and thereafter, a constantly increasing velocity until it passed the crest or throat of the flume. The crossing of the current from the right of the approach channel to the left of the flume with its high velocity causes a greater depth of (2115) water on the left side than on the right side, in which the stilling well is constructed.

The difference of 2.31 feet per second velocity on opposite sides at the throat of the flume is conclusive in itself that accurate discharge of the water from the tunnel cannot be obtained by the Improved Venturi or Parshall flume as now installed. These measurements establish the fact that unbalanced velocities exist at the crest or throat of [fol. 1316] the flume.

Referring to Exhibit 100 again, as to whether any of these photographs indicate a variation in the depth of the water in the flume or in the approach, Photograph 6 shows the Venturi flume itself, and a portion of the approach channel above the flume. Here the current has crossed from the right hand side of the approach channel to the left hand side of the Venturi flume and, as you observe up on the crest, it is higher on the left hand side than on the right hand side. It is also very much swifter on the left side than on the right hand side, as determined by the current meter measurements as made by Mr. Meeker and myself.

The Parshall-Hinderlider-Field current meter notes, which was a measurement of the flow of water at the east portal of the Laramie-Poudre Tunnel on July 5th, 1932, shows the following information—the (2116) gauge heighth given in the notes at the beginning is 1.13 feet, and at the ending, 1.17 feet; a mean gauge height of 1.15 feet. The average depth of the cross-section is 1.33 feet, and the discharge computed from the current meter measurements

made by Mr. Hinderlider and Mr. Parshall and Mr. Field is given as 36.52 cubic feet per second. The discharge taken from the Venturi table, using the mean gauge heighth, would be 30 cubic feet per second, and using the average depth as the gauge heighth, is 37. cubic feet per second.

The current meter notes of the Hinderlider-Field-Parshall measurement of July 5th, 1932, show that the measurement was made four feet upstream foom the crest of the Improved Venturi flume, where the width of the flume was 7.7 feet. The velocity of the water per second obtained across the section measured varied from 0.52 feet on one side of the flume to 4.24 feet on the opposite side of the flume. This difference of 3.72 feet in velocity of the water on the opposite sides of the flume within four feet of the crest, are the results of debris in the approach channel and [fol. 1317] converging section of the flume and creates the "unbalanced velocities" to which Mr. Parshall has referred in his statement to W. W. McLaughlin, Chief of the Division of Irrigation, United States Department of Agriculture, under date of April 14th, 1933, in which he said, "In my opinion, it is asking too much of this type of measuring device to measure within practical limits under conditions imposed here, because of the debris and unbalanced velocities."

Mr. Parshall has testified at Page 1365 and 1366 of the testimony in this case, that the Venturi flume at the east portal of the Laramie-Poudre Tunnel was constructed from plans prepared by himself. (2117) Both the plans of the State Engineer's office of Colorado, as given in Paragraph 4, Page 9, Complainant's Exhibit No. 56, and Mr. Parshall, in his testimony and in Paper No. 1586, page 843, Transactions American Society of Civil Engineers, provide for the floor to be level, both length and crosswise. The crest is the down-stream end of the level floor. The gauge rods or automatic recording devices for obtaining the upper head are referred to the crest level as the datum. Thus, the plans provide for correct installation—that the floor of the converging section and the crest be at the same elevation. It is assumed that the floor and crest of the Improved Venturi or Parshall flume at the east portal of the Laramie-Poudre Tunnel was properly constructed according to the plans of Colorado and the inventor of the flume, Mr. Parshall.

The Hinderlider-Parshall-Field current meter notes taken during the measurement of the discharge of the Laramie-Poudre Tunnel at the east portal, July 5th, 1932, show a considerabe difference between the depth of the water in the flume as shown by the depth measurements, and the depth of the water as shown by the staff gauge height. As both measurements give the d*pe*th of water above the crest of the flume and the water surface, at, approximately the same point, the readings of the staff gauge and the depth of water should agree very closely.

[fol. 1318] Further examination of the notes show that at the beginning of the measurement, the gauge height was 1.13, and the first depth measurement, 1.37, or a difference of 0.24 feet, or 2.88 inches. At the ending of the measurement, the gauge height was 1.17 and the depth measurement, 1.34, or a difference of 0.17 feet, or 2.04 inches. The (2118) mean gauge height for the measurement was 1.15, and the mean depth measurement 1.33, or a difference of 0.18 feet, or 2.16 inches. This would indicate that the zero of the gauge, which is presumed to be level with the floor and crest, was really from 2.04 to 2.88 inches above the floor.

This prevailing condition would indicate that the staff gauge or recording device was indicating or registering a depth of water in the flume from two to three inches less than the actual depth. The use of this mean gauge height of 1.15, under these conditions, to determine the discharge from the table of discharge published by the State Engineer of Colorado, would give the amount of water discharged as 30 cubic feet per second, or 82 per cent of the amount delivered by current meter measurement; whereas, if the gauge height was corrected to show the actual average depth of water as 1.33, on the assumption that zero of the gauge is even with the floor of the flume, the discharge from the tables would be 37.82 cubic feet per second, or within 3.5 per cent of the discharge obtained by the measurement. The automatic recorder at the flume, under these conditions, would report as discharged, only 82 cubic feet out of every 100 cubic feet passing the flume.

Mr. Whitten, hydrographer for the State Engineer's office of Colorado, made a current meter measurement of the discharge of water through the Improved Venturi or Parshall flume at the east portal of the Laramie-Poudre Tunnel

on September 5th, 1932, two months after the Hinderlider-Parshall-Field measurement was made. These current meter measurements show that on September 5th, 1932, the gauge heighth read 0.90 feet at the beginning, 0.90 at the end, and gave a mean heighth of (2119) 0.90 feet. The [fol. 1319] average depth of the cross-section was given as 0.92 feet. The discharge computed from current meter measurements was 0.92, and the discharge taken from the Venturi table, using the mean gauge heighth, 0.39. The width of the section at the point of Whitten's measurement is given in the notes as 7.3 feet. The Hinderlider-Parshall-Field width of the section, as 7.7 feet, showing that the two measurements were made at practically the same location in the converging section of the flume.

The current meter notes of Mr. Whitten show the floor of the flume and the zero of the gauge to be practically of equal elevation—the variance being only 0.02 feet, or less than one-quarter of an inch, as compared with two or three inches in the July 5th measurement by Parshall, Hinderlider and Field. Mr. Whitten again measured on September 5th, 1932, the discharge through the flume at apparently the same section, and found the zero of the gauge and the floor to differ by 0.06 feet, or about three-quarters of an inch. Both of Mr. Whitten's measurements check closely with the discharge measurements given for his gauge heights in the standard table of discharge for the Improved Venturi flume.

Examination of these current meter notes indicate that competent and qualified hydrographers, including the inventor of the flume, himself, viz., Mr. Parshall, are unable, under the conditions existing at the Improved Venturi or Parshall flume, to make comparable measurements. In my opinion, this Improved Parshall-Venturi flume is a practical and satisfactory device for measuring water when installed where conditions are similar to those prevailing at the laboratories where flume was designed (2120) and tested and calibrated.

Mr. Ralph L. Parshall, the inventor of the Improved Venturi or Parshall flume, states, in Bulletin 336, page 32, Colorado Experiment Station, Colorado Agricultural College, Fort Collins, Colorado, entitled, "The Improved Venturi Flume", by Ralph L. Parshall, Irrigation Engineer, "This [fol. 1320] device, like any other water-measuring struc-

ture, must be properly installed and maintained to give best results." On page 43 of Bulletin 336, Mr. Parshall says: "For the smaller sizes, the fact that the longitudinal axis of the structure is not exactly coincident with that of the channel is of little importance where only moderate flows have to be cared for, but the large flumes should be so set that this axis is approximately correct to permit the stream to approach and leave the structure without undue distortion. Hence, the side of the flume should not be in a decided bend of the channel."

I agree with that statement as to what constitutes proper installation of an Improved Venturi flume, and with Mr. Parshall's opinion that the present installation, as expressed in the memorandum dated April 14th, 1933, which has been identified as an exhibit in this case, as to whether it would properly and correctly measure water under the conditions of the installation. The conditions existing at the east portal of the Laramie-Poudre Tunnel are unsuitable for the installation and operation of an Improved Venturi or Parshall flume if the measuring device is required to measure the discharge of water within practical limits—which is the requirement for all recognized diversions.

I have examined the canal diverting water from the (2121) Laramie to the Poudre, of which the tunnel is a portion, from the west portal to the tunnel and the intake point. From my knowledge of the territory through which the canal passes, there is, in my judgment, a suitable place to measure water or to install the measuring device in the canal of this diversion works. The canal between the point of diversion on the Laramie River and the west portal of the tunnel offers an ideal place for the installation and operation of an Improved Venturi or Parshall flume, or any other suitable standard measuring device. I base that statement upon the fact that the velocity of approach would be uniform and not excessive. Low and uniform velocities [fol. 1321] would eliminate the transportation of materials which would lodge in the flume and avoid the deposits of debris and the unbalanced conditions on the Improved Venturi or Parshall flume at the east portal of the Laramie-Poudre Tunnel as to make its measurement unreliable.

I have observed the channel as it flows between the intake point from the Laramie River and where it empties into the

west portal, and have found the condition of the channel to be, in my judgment, satisfactory for proper measurement—it would require a little work in order to make it satisfactory. It possesses a long straight channel, very uniform and regular, and uniform velocities until it (2122) reaches a point about two or three hundred feet above the west portal of the tunnel, where debris has evidently fallen in from the banks and created a bar and restricted the sides until it formed a barrier in the channel. The removal of this barrier, which, in my judgment, would be relatively inexpensive, costing probably not more than two or three hundred dollars, would permit the water to flow at a lower depth in the canal above and make it suitable for the installation of either a rectangular flume or Improved Parshall-Venturi flume. That installation could be made in a straight portion of the channel, where the water could approach it directly and leave it without making a bend either way. I agree with the testimony of the witness for the defendant that that is a favorable condition for accurate results from the installation of a Venturi flume.

Cross-examination.

By Mr. C. D. Todd:

I have been familiar with the Sand Creek Ditch in Wyoming for several years. I would say I have been going to Sand Creek for the last fifteen or eighteen years, and of course, have been much more familiar with it during my term as State Engineer, which was from January 3rd, 1927, until April 1st, 1933. I have been connected with the State Engineer's (2123) office at times for the past thirty years, off and on.

[fol. 1322] I had a communication with Mr. Eaton about turning down some water for the appropriators in Wyoming. In those conversations, he stated that he would turn down water; my conversations were always with Mr. Rex Eaton on the matter of turning down water. I would not say that that was late in the season when there was scarcely any water on either side of the line; there was considerable water in Sand Creek above the headgate of the Divide Ditch, but the water below inWyoming was very low—so low that some of the appropriators were unable to abtain water.

I presume that water was made up of the Deadman water plus any that was in Sand Creek; I had no knowledge at that

time whethere there was any Deadman water flowing in Sand Creek or not. As to the elevation of Deadman Creek being such that water would run later there than in Sand Creek, I would not care to make that statement. I think the elevation of the upper reaches of both Deadman and Sand Creek are about the same, and whatever snowfall they had on one, presumably they would have on the other.

The water that is in Sand Creek in Wyoming is used (2124) mostly on meadow land, and the water so diverted on the meadow lands readily runs back into the creek again, if the diversion is sufficient to permit return flow. The meadows lie very close to the creek. They are along the stream, and none of them, I would think, would extend more than perhaps three-quarters of a mile or a mile from the stream. I do not believe that the soil is under-laid with gravel. I think it would be favorable for a heavy return on the surface at a slope.

I think I remember the testimony of Mr. Fleming, who testified as the first witness in this case. I cannot recall what his statements were concerning the return flow to the stream. Looking at Page 113 of Exhibit No. 1, prepared by Mr. Fleming, who spent a whole summer in 1902 in measuring the waters of Sand Creek, as to the return waters after [fol. 1323] the first flow over the land, he says, "Per cent of amount applied returning", and he gives 7.6, which I assume is a percentage; (2125) but in the statement above, ht says, that the return flow is 95.1 per cent after the water has been on the land.

As to whether, if there was ten feet or twenty feet of water in Sand Creek, it could be utilized by several ditches before it would be exhausted by the consumptive use, my experience of thirty years would lead me to believe that in order to get 95 per cent return flow, an enormous diversion would have to be made, and with the ordinary diversion of these ditches in Sand Creek, I doubt very much whether they have that return flow. We all know that water for consumptive use has to have a carrier, but a carrier sufficient to return 95 per cent of the water would be a big one, and I believe that his table is misleading.

As to his statement that he spent the entire summer in measuring the waters, and prepared that table on that, I would say this, that my experience over thirty years would indicate that unless there was an enormous diversion of

water on to the land, that you could not hope to obtain a return flow of 95 per cent. I do not believe you would ever get 95 per cent return. As to whether you could ever get 75 per cent, of course, the amount of return flow depends on the amount of diversion—I think, under normal conditions, you could get probably sixty or seventy per cent.

(2126) There is nothing to keep the creek from running right in to those ditches down in there and creating a heavy diversion, if there is water available in the stream for diversion. It diverts itself—in many cases, they are what we call self-operating ditches. As to whether the water officials have any control over the ditches, most of them are small and could be shut off by building a small dirt dam with a shovel. If they dammed it up, they would not get any water, unless they leave a small opening in the dam. If the water commissioner is called upon, he usually takes a shovel [fol. 1324] along to put in dams, especially where there is no structure.

It is not possible to so regulate the water in that creek with the existing appliances so it will go to the oldest appropriators and exclude the juniors. It would be necessary for the water commissioner to build some sack dams or shovel in an earth dam, which we frequently have to do on the Laramie River, in order to regulate some of the ditches where the headgates are missing or have been washed out. The statutes of Wyoming provide that the superintendent of the water division may order the owner of the ditch to construct a suitable headgate or measuring device.

As to whether or not there is a dam in the creek some miles north of the Colorado state line by which water is diverted over (2127) into Antelope Creek, I could not testify to that, Mr. Todd, I never noticed that particular ditch.

My recollections are, without refreshing my mind from my diaries, I had a complaint about there not being sufficient water for these meadow lands every year, and in some years I had two or three. I called up Mr. Eaton on most of those occasions. I think sometimes I called the water commissioner and asked him to look after the situation. As a result of that, I believe the water was let down on some occasions; on other, I left that matter to the water commissioner and whether it was let down or not, I do not know. I never heard anything from it.

Such occasions and demands occur on every stream, where the water commissioner is called upon to shut off some ditches and turn on others temporarily. Almost every stream requires administration. That is the general purpose of having a water commissioner on the ditch or river. It is not possible for him to go along always to see that everybody is getting water; he relies more or less on complaints, and (2128) rectifies them if it is possible.

I stated there was some gravel in the upper and lower [fol. 1325] parts of the Divide flume. I would judge the ditch had quite a heavy fall, and what I found there was brought there by the action of the water. Some of it lodged above, and some below, and some ran through. The point where the measuring was taking place was practically clear, but the fact that there was a deposit built up in the channel above and below would affect the operation of the measuring devices. The measuring devices would not take into account the hole that has been formed at the measuring flume. If the flow is clear at the point where the device is operating, it gives a true measurement of the depth of the (2129) water on the floor of the flume, but not to the index of the discharge at that point under those conditions.

To operate the rectangular flume, it is necessary and recognized, I think, by all water officials that conditions must be maintained the same both above and below within the flume, or otherwise you get a new condition and you have rated your flume for a certain definite condition. It is your intention to keep the conditions the same, and when those conditions change, you have a changed condition and the recording devices, or staff gauge, while reading the depth of the water in the flume, if the bottom is clear of gravel, does not give a correct index of the water in there.

That flume is located in line with the ditch, and I would say it is well located, as far as the line is concerned, and substantially built. The wash I spoke of is disintegrated granite from above. I have not made a study as to whether there is any way to prevent that. There might be some way of de-silting the water of the disintegrated granite; I thought of that when I was at the ditch, but did not have the time to look the ditch over. I do not know as that would be a very unusual thing to attempt. Perhaps, if it would save maintenance of the ditch and that constant cleaning

during the (2130) period of operation, it might be a profitable investment.

[fol. 1326] The company employes have cleared this debris out from time to time right on the flume, in order to get a measurement, but the clearing of the ditch itself is a matter, I think, of where the water has been out of the ditch when the cleaning took place. I am referring to this deposit in the ditch. I would not say that the deposit in the ditch would necessarily have to come down; I would think perhaps there might be some way of removing it. As to whether in an ordinary state, more or less debris will come along from time to time and have to be cleaned out, I think this deposit indicates there is a cutting somewhere in the ditch —somewhere there is a very extensive grade—and perhaps the lining of that section, or some means of de-silting the gravel from the ditch below the section, would save the expense and keep this deposit out of the ditch and the flume and permit an accurate measurement of the water flowing in the ditch.

If the floor of the flume is cleaned periodically, from day to day, or frequently, as the material assembles, it would not affect the flow of the water through the flume, but it would affect the heighth of the staff gauge or depth of water on the recording instruments, so (2131) when you apply that depth to your rating curve, you would get a false discharge—that is, not the true discharge. I would not say whether it would be sand or water that you would be measuring; I would say this: that the deposit of sand and gravel in that ditch above and below would so change conditions that the measuring devices would not give a true index of the amount discharged, and when applied to the rating table, which had been obtained by calibration of the flume, itself, under favorable conditions, it would not indicate a true discharge.

If there was a deposit of .3 of sand in the flume, it might raise the water level about .3, and then again, it might not. When I answer that way, I am thinking that perhaps as that gravel comes down around the ditch, that there is a flatter [fol. 1327] section of the ditch in there, and this gravel builds back until it increases the gradient, and perhaps, as that gravel builds up, it increases the velocity at that point and, as a result, you may get more water through a certain section there after the deposit was in than you did before.

I make this statement, that you cannot measure the water accurately under these conditions, with a rating curve that has been fixed or used from year to year, month to month, or week to week. You have what we term a shifting channel, and the only way you can determine the flow in a shifting channel is by constant measurements, and we have had to make measurements sometimes daily, sometimes twice a day, and you have a condition in the Divide Ditch, a shifting channel, very similar to the channel on a river. It would be building up and down the flume for some distance —a bar has (2132) been formed on the right hand side of the ditch. Before that was formed, water apparently followed the right bank, but afterwards, it followed it to the left bank, and that created more or less of a cross current. Just as soon as the flume is cleaned off, the gravel begins to deposit again.

We noticed the gravel washing in there along on the bottom, and of course, the bottom of the flume itself, being lower than the grade of the ditch above and below it, it naturally falls into this hole and naturally creates an eddy. It naturally builds itself up, once left to itself, until it builds itself up to the heighth of the gravel in the ditch above, both above and below the flume.

Redirect examination.

By Mr. James A. Greenwood:

The demands coming to me for water upon Sand Creek were based upon adjudicated priorities. All of the rights on Sand Creek have always been carried in our records as existing rights and appropriations, for which they were entitled to water, and which the water officials of Wyoming delivered. They are not only carried that way, but they are that way.

It would be possible to determine the amount of water [fol. 1328] that was diverted by the Divide Ditch, which was contributed by Deadman, (2133) and that which was contributed by Sand Creek. That would be done by measuring the water that flowed out of Deadman Ditch into Sand Creek drainage, and then, with a proper allowance for loss and the measurement of water passing the headgate of the Divide Ditch in Sand Creek, and of the water diverted by the Divide Ditch, and with those factors at hand, this amount

could be determined. In other words, it is a condition that could be so managed as to determine, making allowance for transportation, the exact amount of water that was diverted from Deadman Ditch to the Sand Creek water.

Recross-examination.

By Mr. William R. Kelly:

I did not personally make the survey by which I ascertained the acreage of the irrigated meadows in the Laramie Valley in Colorado. That was made by Mr. Drummond, Mr. Watson and Mr. Lloyd. I did not personally investigate, in the year 1931, whether the (2134) Springer Ditch or the Brinker Ditch were running. I did not myself observe whether the Brown Ditch or the Ben Warren Ditch were diverting in the year 1931; I observed the Link Ditch No. 1 diverting in 1931, for the reason it is located at Atmore Lodge, and I stopped at the Lodge there in 1931 and observed the ditch running water then. I did not stop there very long; I do not remember the date.

As to whether I observed the Lone Tree Ditch diverting in 1931, in my trips in that year, I took the other road to the west and never went up the east road that crosses the Lone Tree Ditch.

Referring to Complainant's Exhibit 100, being Mr. Meeker's photographs at the east portal of the Laramie-Poudre Tunnel, on which I pointed out deposits or debris, designated by Mr. Meeker as "rock bar," I would not say it was a permanent condition. I think it is a condition that changes with the rise and fall of the water in the outlet structure of the Laramie-Poudre Tunnel. However, on [fol. 1329] every (2135) occasion that I have visited the east portal of the Laramie-Poudre Tunnel, and every photograph that I have seen of that tunnel, or of the outlet structure, has always indicated more or less debris there in one place or another.

I would not say it was there the day before, because some one could have removed that debris the day before, or the day before that, and then it could have filled again. I noticed while I was there for the three hours on the morning of our visit, which I think was June 24th, 1933, that there were occasional rocks rolling through the Venturi flume, and even with the amount of water there at that time,

some seventy or eighty cubic feet per second, rocks were constantly shifting and moving.

Some of these rocks on the right hand side were large, eight or ten inches through, and there was insufficient water to move them; but there was smaller rocks there that were moving. Any velocity above five feet per second is what we call a scouring velocity; it is a velocity that, if directed against a rock or almost anything of that kind, will move it. We have that experience in storm sewers and other places—it will scour it. In the flume on one side, we found a velocity a little more than seven feet per second.

I would think it is a condition that changes. I think there is always debris there, but I do not think the condition that existed that day would always exist. I think at times that bar might shift to some other part of the channel, depending upon the amount of water in the channel. As the amount of water increases through the channel, the tendency to move debris out of the channel into the outlet structure is greatly increased.

(2136) In setting the zero point of the staff gauge in the Venturi flume for measuring, in what is known as the Parshall flume, the zero is set at the crest of the flume, and Mr. Parshall, in all his statements, and the specifications put out by the State of Colorado, provide that the floor of [fol. 1330] the flume be level in all directions and even with the crest; and in so testifying, I assume that this work was constructed under Mr. Parshall, or from plans prepared by Mr. Parshall, and that it must have complied with the requirements he has drawn.

As to his making a correction to make the zero point proper at that Parshall-Venturi flume at the tunnel, my interpretation of the correction that Mr. Parshall made is that apparently it did not apply to the floor of the flume. Apparently he found the staff gauge off in some way; as far as its connection with the floor is concerned, I established no connection.

(2137) AGNES ZIMMERMAN, a witness recalled in behalf of complainant:

Direct examination.

By Mr. James A. Greenwood:

I have been sworn and testified previously in this case. On June 27th, 1932, I visited the location of Bob Creek

Ditch and found it diverting about three second feet from Bob Creek and tributaries into the Cache la Poudre River. That included what is known as Pickett Ditch, the south branch, and the main Bob Creek Ditch.

As to the testimony in this case by Mr. Hinderlider that the diversion of water by this ditch in 1932 was discontinued on June 18th, 1932, from the observations I made, the water had been cut back, the main stream, but the ditches had been broken to let all of (2138) the water back to the Laramie River watershed. It would be necessary to break those ditches in order to do it.

I visited this ditch on June 26th, 1933, and would say it had been diverting water from the Laramie River watershed to the Cache la Poudre River continuously from the beginning of the season. I base that statement on the fact that the ditches were in the same condition, with the exception of slight overflow washes, as they were in the year before—they had been opened to the back. Approximately [fol. 1331] a foot and a half was running when I was there, between twelve and one o'clock at noon; that would have been higher at night, I imagine, considerably higher.

I visited the east portal of the Laramie-Poudre Tunnel on April 9th, 1933, with Mr. Ben F. Powell, my former engineer. The purpose of that visit was just to look it over. We found that day, (2139) 6.72 feet of water going through the canal from the Laramie River to the Poudre River, unrecorded.

Mr. Kelly: We object to that as not proper rebuttal, part of the main case in chief, and it was gone into on the case in chief.

I mean by "unrecorded," the automatic gauge charts were not in operation; that would indicate it was unrecorded. No measurement was being taken as to the amount of diversion. We reduced our observations of that visit to writing. I have a written memorandum or statement to that effect with me.

(Complainant's Exhibit No. 103 marked for identification.)

(Duplicate, original of notes made by Ben F. Powell and Agnes Zimmerman as to the amount of water flowing through the Laramie-Poudre Tunnel on April 9th, 1933.)

Complainant's Exhibit No. 103 is a copy of the notes of what we found that day, written by Mr. Powell, and signed by Mr. Powell (2140) and myself. We made two copies; that bears the signatures of Mr. Powell and myself, and refers to the amount of water we found flowing through the Laramie-Poudre Tunnel on April 9th, 1933, at ten o'clock a. m.

(Complainant's Exhibit No. 103 offered in evidence.)

Mr. Kelly: We object to this as hearsay, self-serving, incompetent, irrelevant and immaterial.

[fol. 1332] Cross-examination.

By Mr. William R. Kelly:

I found .45 of a foot running. I read the gauge and staff; the automatic was not running. I think the ice was about approximately three inches above the water, which would indicate there had been a heavier run earlier than that. Mr. Powell estimated probably (2141) twice as much had run previous to that. It was a cold week that week and we thought the previous run had froze it over. We did not go — the west portal.

I am not under employment by the State of Wyoming in this case, and am not paid by any one to attend these hearings. I do not know whether I have attended them for about thirty days; I kept no track of them. I heard most of the evidence and attended them considerably, here in Cheyenne, and in Colorado. I do not know how many days we were here before; fully ten or fifteen days in Denver. I attended the entire affair. I attended considerably in Fort Collins. My sympathies are very much with Wyoming; there has been too much attempted to be put over on Wyoming. I heard most of the testimony. As to my interest being such that it causes me to come here from my home place in Colorado to Cheyenne, I am certainly not there now.

I was trying to sell a reservoir to the irrigation companies in Colorado which are directly interested in this suit. (2142) Stephen Corlett Downey of Laramie, Wyoming, was my attorney in 1926. I instructed him to write a letter to the various ditch companies interested.

(Defendant's Exhibit X-3 marked for identification.)

(Letter written over the signature of Stephen Corlett Downey, as attorney for Agnes Zimmerman.)

Defendant's Exhibit X-3 is the letter Mr. Downey wrote, purporting to act as my attorney.

(Defendant's Exhibit X-3 offered in evidence.)

I caused that to be sent to Mr. Downey. That condition, however, has been remedied, that they constructed deflec- [fol. 1333] tors in the river causing that condition.

I knew that the Laramie-Poudre Company was applying for a loan from the Reconstruction Finance Corporation, and I made some effort (2143) to prevent that. I understand I have been successful.

(Defendant's Exhibit Y-3 marked for identification.)

(Letter written by Agnes Zimmerman to the president of the Laramie-Poudre Irrigation Company.)

Defendant's Exhibit Y-3 is in my handwriting, and that is my signature. I wrote that to the president of the Laramie-Poudre Irrigation Company; I wanted to show him I had something to do with preventing the company getting the Reconstruction Finance Corporation assistance.

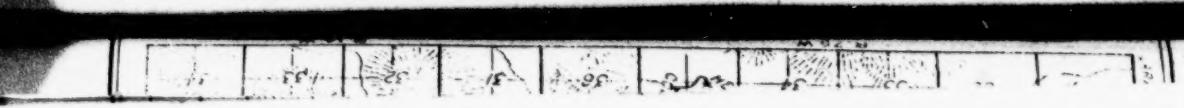
(Defendant's Exhibit Y-3 offered in evidence.)

I did not go — the west portal of the tunnel on April 9th, 1933. As to my knowing whether or not water was coming out of the Laramie River into the tunnel, it could not help but come out of the Laramie River; it could not come from any place else. I never heard of accretion in the tunnel at that time of the year.

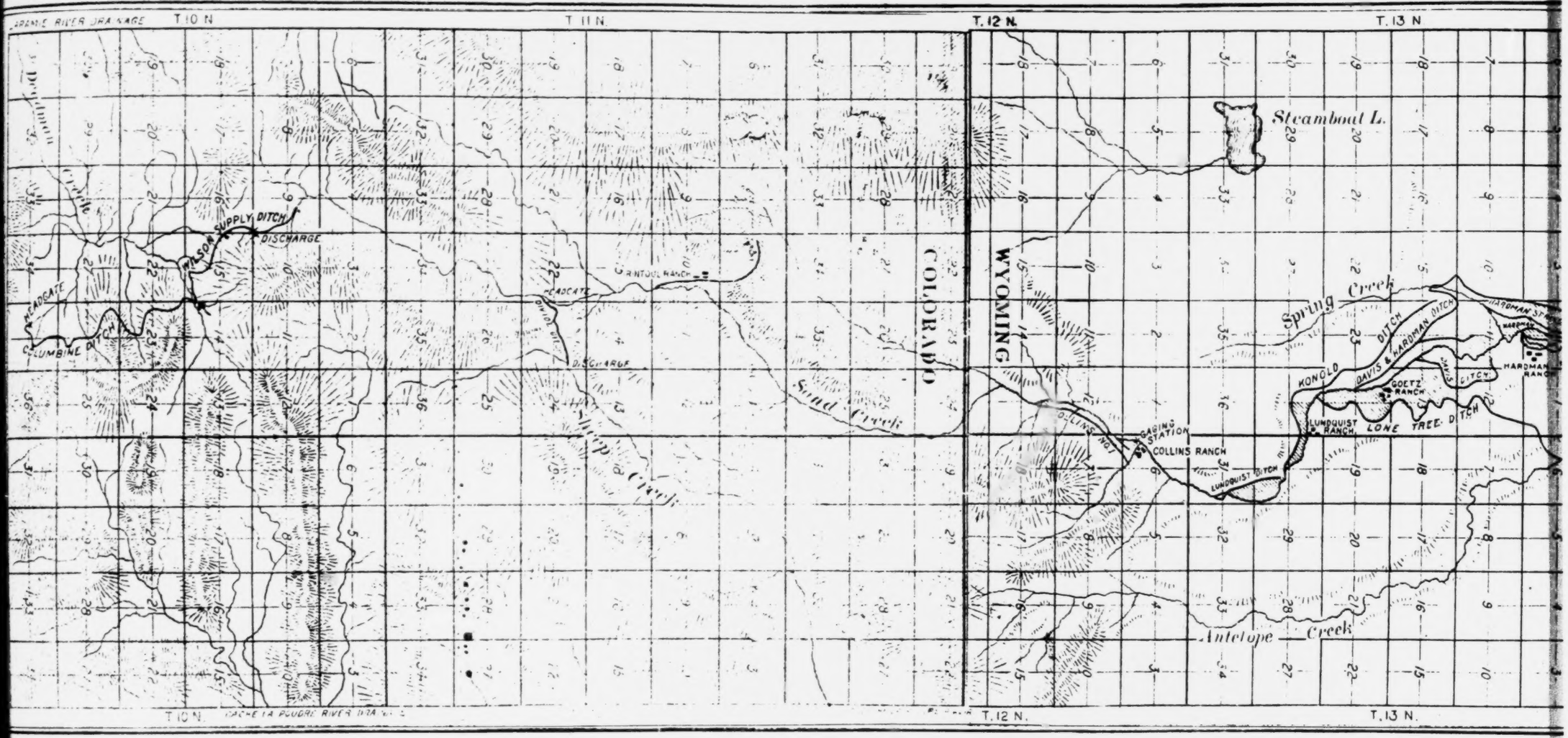
(2144) Mr. Kelly: I would like to ask leave to substitute photostatic copies of this Exhibit X-3 and Y-3, and would like to keep the original.

Mr. Greenwood: That is all right.

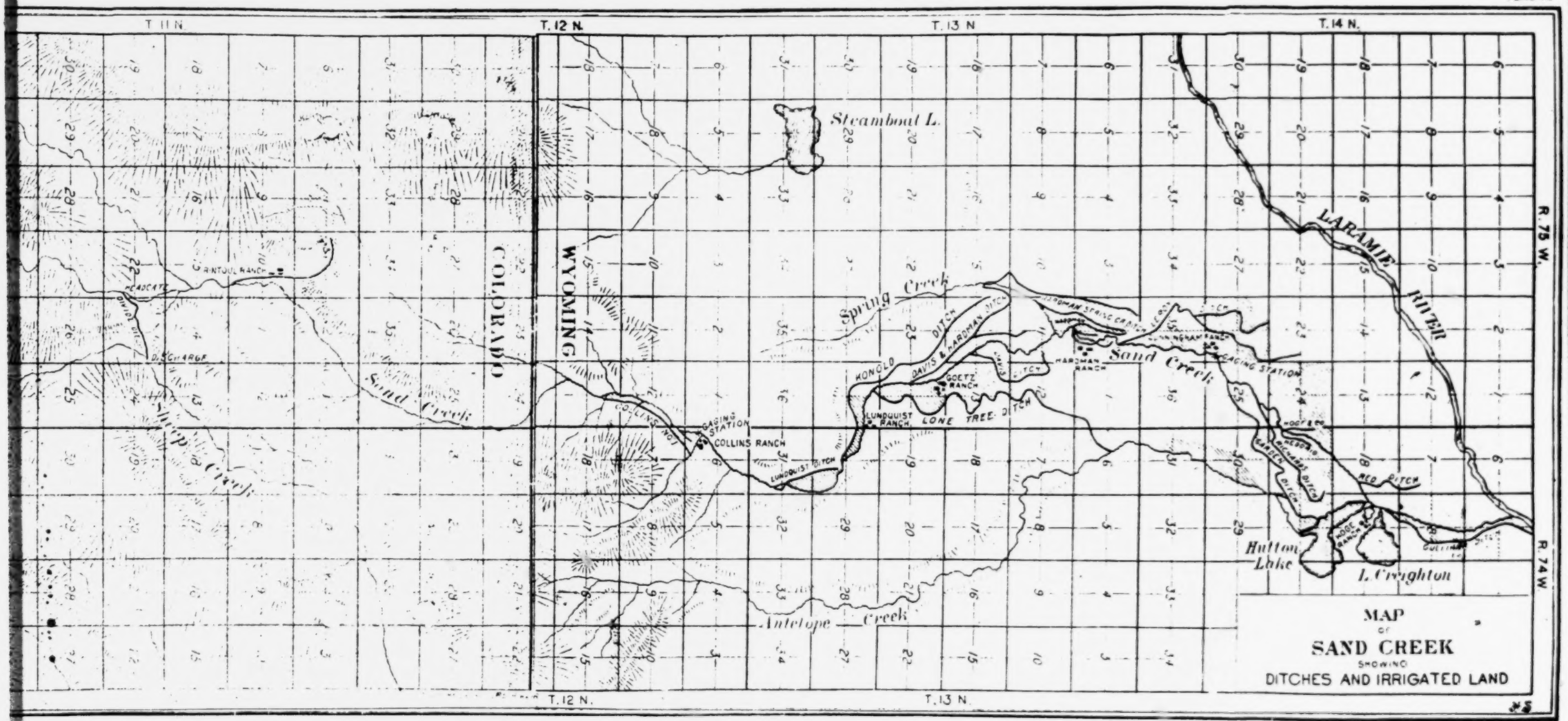
(Thereupon the complainant rested its case.)



COMPLAINANT'S EXHIBIT 1



COMPLAINANT'S EXHIBIT 1



IRRIGATION INVESTIGATIONS ON SAND CREEK, ALBANY COUNTY, WYO.

By Burton P. Fleming,
Irrigation Engineer, University of Wyoming.

INTRODUCTION.

The object of the investigation carried on in the watershed area of Sand Creek during the season of 1902 was to determine, if possible, just how the water supply is utilized in a district where agricultural conditions are typical of those at present existing in southern Wyoming, and to investigate and report upon those economic conditions which in any way affect the utilization of the water supply in such a district. Although the season proved to be somewhat unusual and although other conditions tended to make the result show an extreme rather than the normal, still it is thought that in its location, history, climate, agricultural resources and possibilities, and in the problems which its residents have to face the district chosen was quite typical.

The watershed of the stream lies partly in Wyoming and partly in Colorado. The larger and cultivated portion lies near the southern boundary of Wyoming, in the southern part of Albany County, and forms a part of the elevated table-land known as Laramie Plains. The remaining portion of the district, which is largely mountainous, lies in the north central part of Larimer County, Colo. The course of the stream is shown by the map (Pl. VI). It joins the Laramie River about 15 miles southwest of the city of Laramie.

Irrigation on Sand Creek commenced about 1869. This date also marks the beginning of the live-stock industry upon the Laramie Plains. While the adaptability of the country for stock raising had long been recognized, its remoteness from markets and the presence of hostile Indians materially retarded development. The completion of the Union Pacific Railroad as far as Laramie, in 1868, helped to remove these difficulties, and many persons immediately engaged in the stock business. Cattle were at first allowed to shift for themselves, both winter and summer, without other attention than the annual round-up, but heavy losses during severe winter weather from cold and starvation soon convinced many of the more progressive cattle owners of the necessity of providing forage for winter feeding. They

therefore began to acquire tracts of land along the stream bottoms subject to annual overflow, from which they cut small quantities of native hay. The first of such ranches along Sand Creek was that belonging to Charles Hutton. His ranch extended for some distance along the Laramie River and embraced merely that portion of the Sand Creek bottoms immediately adjacent to that river. Probably 1,000 acres were irrigated from Sand Creek. The method of irrigation was simple. Dams of timber and of brush and rock were built in the creek and the water raised till, by the aid of wing dams on either side of the channel, it was spread out over the creek bottoms, which in many places are quite flat. The hay grown upon these meadows was stacked in the field and in winter was fed to cattle in the open. The history of the locality follows that of similar localities throughout Wyoming. The owner of the original ranch, by investing too heavily in cattle during the inflation in the price of live stock in the few years following 1880, became bankrupt when the general collapse in prices came in 1884. The original ranch was divided up into a number of smaller holdings, other ranches were established upon the stream above the first, and with the increase in population and the depletion of natural pasturage the great stretch of free range on either side of the creek was gradually fenced in.

The resources and possibilities of the region in the line of agriculture are limited almost entirely to the raising of forage for the winter feed of cattle. Stock raising necessarily is and must continue the main industry. The altitudes of the ranches are from 7,500 to 9,000 feet above sea level. The winters are long, dry, and cold. The summers are short, with hot days and cold nights. Frost may be expected any month in the year. The annual rainfall in the cultivated portions is not much over 10 inches in depth, of which half often falls during the fall and winter months. Nothing can be grown without irrigation, and the crops capable of growth under irrigation are limited to the more hardy cereals, potatoes, and forage crops, such as peas, roots, alfalfa, and native hay.

In such a district as this, where the industry is of the simplest character, it might be expected that the economic questions confronting the landholders would likewise be simple. As a matter of fact, however, the questions are many and perplexing. The industry being stock raising, the question of first importance must, of course, be that of providing food for stock. Forage crops having to be grown under irrigation, the usual question is encountered as to the most equitable means of distributing water, and this question will be equaled in importance in a few years by that of how best to utilize the water supply which is constantly increasing in value. Of great importance in the district at present is the question of the interstate water rights. A case involving such rights is now pending in the United States courts.

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The range problem is also one which vitally concerns not only this particular district, but also like localities in all parts of Wyoming to-day. Many of these problems can never be solved satisfactorily by the people themselves, because of the numerous complications involved, and must ultimately depend for their complete solution upon action by the State and Federal governments.

THE WATER SUPPLY.

CHARACTER OF THE WATERSHED AND RAINFALL.

As shown by the map (Pl. VI), Sand Creek rises in a very mountainous country. The upper slopes of the mountains, being at an elevation of from 9,000 to 11,000 feet and as yet not devastated by fire, are covered with a very thick and continuous forest growth. The snowfall being large, these forests aid materially in keeping up the summer flow of the stream. That portion of the watershed lying in Wyoming and a small part of that in Colorado are entirely destitute of forest growth, or, in fact, of any vegetation whatever, except the small amount of grass and sagebrush growing on the hill slopes. Rains in the lower portions of the watershed are therefore accompanied by almost immediate rises in the stream.

Of the annual precipitation in the mountainous portion of the watershed no data is extant, but it probably differs but little from that determined at the places noted,[1] which is on the average about 16 inches. The precipitation in the lower portions of the watershed probably does not differ greatly from that at Laramie, about 15 miles distant. At Laramie the average annual precipitation during a period of eleven years has been 10.5 inches.

The area of the mountainous portion of the watershed is about 36.25 square miles, of the remainder about 47.5 square miles.

FLOW OF THE STREAM.

Unfortunately no data are available on the flow of the stream previous to this year. Two gaging stations were established upon the creek in October of 1901, at which daily gage readings were made from that time up to October of 1902. The first of these stations was established a short distance below the Colorado-Wyoming line, practically above all the irrigated land in Wyoming. The other was established as near the mouth of the creek as possible. By reason of the character of the channel it had, however, to be placed above the Hoge ranch, the largest on the stream. In the following table are given

[1] Average precipitation at Longs Peak station during five years, 19.48 inches. Average precipitation at Meeker station, Colo., during eleven years, 17.48 inches. Average precipitation at Watrous's station, Colo., during five years, 19.09 inches. (See U. S. Dept. Agr., Climate and Crop Service, Bul. 118.)

the discharges of the creek at each of the gaging stations in acre-feet per month during the time that gagings were made. The past season was exceptionally dry, and the flow of the creek was further diminished by recent diversions of its waters above the gaging stations. The flow as given by the table does not, therefore, represent the average in normal years, but rather the lowest extreme. It is quite probable that the stream never gets lower than it did during the season of 1902.

Total monthly discharge of Sand Creek from October, 1901, to September, 1902.

Month.	Upper station.	Lower station.	Month.	Upper station.	Lower station.
1901.	*Acre-feet.*	*Acre-feet.*	1902—Continued.	*Acre-feet.*	*Acre-feet.*
October	207.53	223.00	March	150.00	250.00
November	209.57	505.53	April	521.80	416.29
December	100.00	150.00	May	1,044.60	369.19
			June	168.90	211.00
1902.			July	117.02	118.40
January	100.00	150.00	August	62.20	55.60
February	150.00	200.00	September	64.20	61.00

STORAGE POSSIBILITIES.

Intimately connected with the consideration of the water supply is the question of storage sites, and particularly is this question of interest in the district under consideration because of the shortage of water last summer and the possibility of a recurrence of the condition in the future.

For the first 15 miles of its length Sand Creek has a very rapid fall, and water could be stored only at great expense by reason of the height of dam required. After passing the Wyoming-Colorado boundary, however, the fall is greatly diminished and it is a few miles north of the boundary line that the first reservoir site is found. The site was surveyed by the writer, and seems to present unusual opportunities for storing a comparatively large body of water at small expense. With a 45-foot dam the capacity would be 2,500 acre-feet, and with a slight increase in height of dam the capacity could be greatly increased. The dam would have to be of composite character, rock-filled with earth facing, both of which materials could be found on the site. Assuming an average flow of 500 acre-feet per month in normal seasons, it is seen that about five months' flow of the stream would be required to fill the reservoir.

Another site is found farther down the stream in one of the natural basins common on the Laramie plains. This site, while not requiring as high a dam, would, it is thought, require quite as expensive operations to get the water out after once impounding it as it would to construct the dam at the previous site. The estimated capacity of this site is 1,000 acre-feet. Other sites are found farther down the stream, but too far down to be of material benefit to the users of Sand

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Creek water. It must be expected, however, that any reservoir in the Sand Creek Valley will suffer large losses by seepage because of the porous character of the soil and rock. The prevailing geological formation in the valley is a light and very porous sandstone, which disintegrates rapidly upon exposure to moisture.

DISTRIBUTION AND USE OF WATER.

WATER RIGHTS.

Water rights upon Sand Creek have not, up to the present time, been established in accordance with the Wyoming statutes. In 1894 the State board of control undertook the determination of rights on the stream, and to that end the claims of the several appropriators were filed, the ditches surveyed and mapped, and the areas of land under each of the ditches found. The stream priorities of the several ditches were also established. Sand Creek is, however, a tributary of the Laramie River, upon which the water rights have not yet been adjudicated. Contests were filed against the claims of the Sand Creek appropriators by claimants on the Laramie River, and consequently the rights on Sand Creek could not be finally and officially established prior to the adjudication of rights on the main stream.

The following table gives the result of the adjudication of the rights on Sand Creek made by the State board of control in 1894:

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Appropriations from Bend Creek.

Priority number.	Name of ditch.	Name of appropriator.	Post-office address.	Date of appropriation.	Use for which appropriation is made.	Area (est. gated.	Description of lands irrigated.
						Acres.	
2	James Hardman	James Hardman	Laramie	1879	Irrigation, stock, and domestic	127	SE. ¼ SW. ¼, 15 acres; SW. ¼ SE. ¼, 32 acres; NW. ¼ SE. ¼, 60 acres; SW. ¼ NE. ¼, 20 acres, sec. 2, T. 13 N., R. 75 W.
3	Gulliban Ditch	J. M. Hoge	do	1880	Irrigation	224	W. ½ NW. ¼, 80 acres; NE. ¼ NW. ¼, 40 acres; SE. ¼ NW. ¼, 20 acres; NE. ¼ SW. ¼, 30 acres; NW. ¼ SW. ¼, 40 acres; SW. ¼ SW. ¼, 10 acres; SE. ¼ SW. ¼, 14 acres, sec. 8, T. 14 N., R. 74 W.
2	Red Ditch	do	do	1880	do	207	NE. ¼ NE. ¼, 20 acres; NE. ¼ NE. ¼, 160 acres, sec. 18. SW. ¼ SW. ¼, 27 acres, sec. 8, T. 14 N., R. 74 W.
1	Gulliban, No. 2	Wyoming Central Land and Development Co.	do	1871	do	196	NE. ¼ NW. ¼, 3 acres; SE. ¼ NW. ¼, 32 acres; SW. ¼ NW. ¼, 5 acres; E. ½ SW. ¼, 80 acres; SW. ¼ SW. ¼, 40 acres; NW. ¼ SW. ¼, 30 acres, sec. 5, T. 14 N., R. 74 W.
1	Braden Ditch	do	do	1871	do	92	NE. ¼ NW. ¼, 16 acres, lot 1, 50 acres; lot 2, 30 acres; lot 3, 16 acres, sec. 19, T. 14, R. 74.
1	Nesbart Ditch	do	do	1871	Irrigation and domestic	122	Lot 3, 30 acres; NE. ¼ NW. ¼, 39 acres; SE. ¼ NW. ¼, 40 acres; NE. ¼ SW. ¼, 24 acres; lot 2, 19 acres, sec. 18, T. 14 N., R. 74 W.
1	Red Ditch	do	do	1871	Irrigation	73	NW. ¼ NW. ¼, 40 acres; SW. ¼ NW. ¼, 32 acres, sec. 17, T. 17, R. 74.
4	Gulliban, No. 1 Ditch	J. M. Hoge	do	1882	do	176	SE. ¼ SW. ¼, 32 acres; NE. ¼ NW. ¼, 30 acres; SE. ¼ NW. ¼, 14 acres; NW. ¼ SE. ¼, 30 acres; NW. ¼ SE. ¼, 39 acres; NW. ¼ NE. ¼, 27 acres; NE. ¼ NE. ¼, 4 acres, sec. 8, T. 14, R. 74; NE. ¼ NE. ¼, 17 acres; NW. ¼ SE. ¼, 5 acres; SW. ¼ NE. ¼, 10 acres; NW. ¼ NE. ¼, 32 acres; NE. ¼ NW. ¼, 17 acres; NE. ¼ NW. ¼, 4 acres, sec. 9, T. 14, R. 74.
1	do	Wyoming Central Land and Improvement Co.	do	1871	do	110	NE. ¼ NW. ¼, 6 acres, sec. 17, T. 14, R. 74; SE. ¼ NE. ¼, 10 acres; NW. ¼ SE. ¼, 32 acres, sec. 32, T. 15, R. 74.
1	Le Roy Ditch	Robert J. Gardiner	do	Oct. 1883	do	160	NW. ¼ SW. ¼; NE. ¼, sec. 24, T. 14, R. 75.
5	do	Peter Cunningham	do	May 1 1885	do	105	All of sec. 26, T. 14, R. 75, except 15 acres in SE. ¼ SE. ¼ and 20 acres in NW. ¼ NW. ¼, sec. 25.
6	Davis Ditch, No. 1	[illegible]	do	Spring, 1885	Irrigation and stock, 300 head	276	SE. ¼ NE. ¼, 20 acres; NE. ¼ NE. ¼, 40 acres, sec. 14. NW. ¼ NW. ¼, 32 acres; NE. ¼ NW. ¼, 12 acres, sec. 13. W. ½ SW. ¼, 80 acres; SE. ¼ SW. ¼, 12 acres, sec. 12. NE. ¼ SE. ¼, 30 acres; SE. ¼ SE. ¼, 30 acres, sec. 11, T. 13, R. 75.
7	Le Roy Ditch	Rawhide Live-stock Co.	do	do	do	318	SW. ¼ SE. ¼, 30 acres; NW. ¼ SE. ¼, 60 acres; NE. ¼ SE. ¼, 6 acres; SE. ¼ SW. ¼, 15 acres; NW. ¼ NE. ¼, 160 acres; E. ½ NE. ¼, 90 acres; NE. ¼ NE. ¼, 15 acres, sec. 23, T. 14, R. 75.
8	W[illegible]gold Ditch	William Kendall	do	Apr., 1886	Agriculture, irrigation, and culinary	120	SE. ¼ SE. ¼ NW. ¼, 10 acres; NE. ¼ SW. ¼, 80 acres; SW. ¼ SW. ¼, 30 acres, sec. 14, T. 13, R. 75 (also 2.20 acres, sec. 23, T. 13, R. 74).
9	do	N. Lundquist	do	1886	Irrigation	78	SE. ¼ NW. ¼, 15 acres; SW. ¼ NW. ¼, 18 acres, sec. 30, T. 13, R. 74; SE. ¼ NE. ¼, 15 acres; SW. ¼ NE. ¼, 30 acres, sec. 25, T. 13, R. 75.

9	Collins, No. 4	P. B. Collins	do	Apr., 1907	do	58	NW. ¼ NW. ¼ sec. 7, NE. ¼ NE. ¼ sec. 12, T. 14 N., R. 74 W.; 2.70 acres, NE. ¼ NW. ¼ sec. 12, T. 14 N., R. 74 W.; 10 acres, NW. ¼ NE. ¼ sec. 12, T. 14 N., R. 74 W.; 22 acres, NE. ¼ NE. ¼ sec. 12, T. 14 N., R. 74 W.; 2 acres, lot 1, 20 acres, sec. 13, T. 14 N., R. 74 W.	
10	Ellis Lands Ditch	Wyoming Central Land and Develop ment Co.	do	1871	do	10	NE. ¼ NW. ¼ sec. 11, T. 14 N., R. 74 W.	
10	do	do	do	1905	do	45	NW. ¼ NW. ¼ sec. 11, T. 14 N., R. 74 W.; 10 acres, NW. ¼ NW. ¼ sec. 11, T. 14 N., R. 74 W.; 15 acres, NE. ¼ NW. ¼ sec. 11, T. 14 N., R. 74 W.; 20 acres, NW. ¼ NE. ¼ sec. 11, T. 14 N., R. 74 W.	
11	Davis Ditch, No. 2	John Davis	do	May, 1900	Irrigation, stock and domestic	240	NE. ¼ NE. ¼ sec. 1, NW. ¼ NW. ¼ sec. 6, T. 13 N., R. 73 W.; 20 acres, NW. ¼ NW. ¼ sec. 1, T. 13 N., R. 73 W.; 10 acres, NW. ¼ NW. ¼ sec. 11, T. 14 N., R. 74 W.; 15 acres, NE. ¼ NW. ¼ sec. 11, T. 14 N., R. 74 W.; 20 acres, NW. ¼ NE. ¼ sec. 11, T. 14 N., R. 74 W.; 15 acres, SW. ¼ NW. ¼ sec. 11, T. 14 N., R. 74 W.	
12	Lone Tree Ditch	do	do	May, 1900	Irrigation and stock	65	SE. ¼ NW. ¼ sec. 1, NE. ¼ SW. ¼ sec. 1, NW. ¼ SE. ¼ sec. 1, SW. ¼ NE. ¼ sec. 1, T. 13 N., R. 73 W.; 10 acres, NE. ¼ NE. ¼ sec. 2, T. 13 N., R. 73 W.	
13	Collins Ditch	P. B. Collins	do	1900	Irrigation	45	NW. ¼ NE. ¼ sec. 1, T. 13 N., R. 73 W.; 10 acres, NW. ¼ NW. ¼ sec. 11, T. 14 N., R. 74 W.	
14	Davis Ditch, No. 3	Alice Hardman	do	Aug. 8, 1902	Irrigation and stock	240	W. ½ NW. ¼ sec. 1, T. 13 N., R. 73 W.; 10 acres, NE. ¼ NE. ¼ sec. 2, T. 13 N., R. 73 W.	
15	Lone Tree and Side Dope	J. M. Hugo	do	May 17, 1904	Irrigation and stock	100	E. ½ NW. ¼ sec. 11, T. 14 N., R. 74 W.; 10 acres, NW. ¼ NW. ¼ sec. 12, T. 14 N., R. 74 W.; 10 acres, NE. ¼ NE. ¼ sec. 11, T. 14 N., R. 74 W.; 10 acres, NW. ¼ NW. ¼ sec. 11, T. 14 N., R. 74 W.	
16	Davis Ditch, No. 4	Alice Hardman	do	Nov. 28, 1904	Irrigation	125	NW. ¼ NW. ¼ sec. 11, T. 14 N., R. 74 W.; 130 acres, NW. ¼ NE. ¼ sec. 11, T. 14 N., R. 74 W.; 10 acres, NE. ¼ NW. ¼ sec. 11, T. 14 N., R. 74 W.	

Under the provisions of a law passed by the Wyoming legislature in 1903, water rights can be established on a tributary prior to the adjudication of rights upon the main stream, but are subject to contest by claimants of earlier rights upon the main stream. This will allow of the final establishment of Sand Creek rights at an early date, subject, of course, to future contest by earlier appropriators on the Laramie River.

No water commissioner has, up to the present time, had jurisdiction upon Sand Creek. Conditions found in the district can not, therefore, be said to be indicative of the advantages or defects of the Wyoming law relating to the distribution of water in its practical working. Up to the past season no very serious scarcity of water has been experienced. Each appropriator has been able to get sufficient water to mature his crops, though probably in many instances it was not all he would have desired to use. As has been said, however, the season of 1902 was characterized by an unusual scarcity of water. Under such a condition the disadvantage of having no disinterested person to apportion the water upon some established basis became plainly apparent. While there is a tacit understanding and recognition of their respective rights by the several ranchmen, but little attempt was made by any of them to limit the amount of water he diverted from the stream. Being bound together by a more or less close community of interest, the ranchmen with earlier rights were not eager to enforce these rights against their neighbors, and the consequence was that some of the later appropriators obtained water to which technically they had no title. It is doubtful, however, if conditions would have been greatly different if a water commissioner had been given control of the distribution of the supply. In other districts with which the writer is acquainted nearly the same conditions prevail. Water has not become so scarce that its value is very highly appreciated. It is seldom measured at its point of diversion from the stream, and when measured, the methods in most instances are crude and inaccurate. The water commissioner is usually a resident of the district over which he has jurisdiction. By too strict and conscientious an observance of his duties he is liable to get into disrepute with those of his neighbors who possess inferior rights, and, on the other hand, if not strict enough he will incur the enmity of the owners of early rights. The position is usually one in which a neutral course is impossible, or at best very hard to maintain, and the compensation is insufficient to justify a man in neglecting his private affairs to give his undivided attention to the settlement of those difficulties which arise. The situation therefore becomes so entirely unpleasant for him that unless he be a man of unusual hardihood and determination he usually gives up the office. Such a state of affairs is naturally very detrimental to the interests of the community and would tend in the end to defeat one of the objects

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upon which the Wyoming law is based—that is, the equitable division of water according to vested rights.

One problem which must be solved before any method of distribution can be rendered effective is to find the proper amount of water to apply to hay meadows.

DUTY OF WATER.

During the past season a beginning was made in the determination of the amount of water actually used upon hay meadows. It is necessary to repeat, however, that the results show conditions in dry years rather than during ordinary seasons, and can not therefore be made the basis of very trustworthy conclusions as to normal conditions. As before stated, two stations were established upon the stream at which continuous measurements were made during the season. Between these stations seven ditches are taken out. It was thought that by keeping a continuous gaging of the flow in each of the ditches and likewise of the flow of the stream at the two gaging stations a very close determination of the amount of water used could be obtained. Arrangements were made with ranchmen living near the head gates of the different ditches to make gage readings at frequent intervals, particularly when for any reason the flow in the ditch increased or decreased. The several gentlemen with whom the arrangement was made conscientiously performed their part of the work, and it is thought that the results are fairly accurate. The measurements were made by weirs in cases where the necessary fall could be obtained, but as in most of the ditches the fall is very slight a section of the ditch about 25 feet long was straightened and evened on either side of the gage, and a number of measurements made by current meter with different depths of water in the ditch, a rating thus being obtained.

The total daily discharge in the seven ditches is shown graphically in fig. 3.

The following table gives the flow in all of the ditches mentioned:

Discharge of ditches between Upper and Lower gaging stations, Sand Creek, Wyoming.

Ditch.	Discharge in acre-feet.				Total.	Area under ditch.[a]	Acre-feet per acre.
	April.	May.	June.	July.			
						Acres.	
Lundquist	0.00	33.49	18.96	0.00	52.45	132	0.40
Kendall	29.50	153.49	33.48	35.49	251.96	398	.63
Lone Tree	14.00	447.50	69.20	57.12	577.82	786	1.45
Davis & Hardman	.00	81.39	.00	.00	81.39	480	.17
Davis	.00	66.84	15.00	.00	81.84	256	.32
Hardman	53.20	229.61	101.72	9.00	394.13	127	3.10
Leroy	.00	109.64	.00	.00	109.64	605	.18
Total	96.70	1,121.96	228.36	102.21	1,549.23	2,786	

[a] Total area under ditch. Actual area to which water was applied impossible of determination.

From the above data it is seen that 1,549.23 acre-feet was diverted from Sand Creek and used in the seven ditches in which measurements were made. From data supplied by the ranchmen whose lands are watered by these ditches it is found that the yield of hay was approximately 160 tons. Probably much more could have been grown had the same amount of water been supplied to a smaller area. As each man had to have some share of the supply it was distributed over such a large area that it did little good anywhere. In most cases a growth of grass was obtained which would make winter pasturage for cattle. As calculated from the above data the average depth to which water was applied to the land was 0.646 foot or 7.75 inches. Meadow hay estimated upon the value returned in feeding cattle is worth about $10

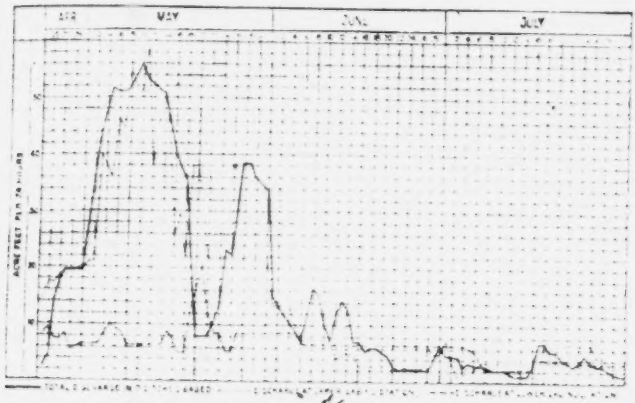

FIG. 3.—Diagram showing discharge of ditches from Sand Creek.

per ton. Upon this basis the value of water per acre-foot is seen to be about $1. Low as this may appear to be it is probably not far from the average value returned from the use of water upon such lands. The Hardman Ditch has the earliest right upon the stream. During the past season its flow was probably more nearly at the normal than any of the other ditches. As can be seen from the above table a total amount of 394.13 acre-feet was used under this ditch during the season. The area irrigated was about 127 acres. Undoubtedly much of the water applied almost immediately returned to the stream, as the land borders upon the creek and the soil is of a very porous character. Based upon actual measurements the total depth to which water was applied was 3.10 feet. The yield of hay from this area of 127 acres was about 20 tons. Its value would be about $200, which would give

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to water used upon this meadow a value of about 50 cents per acre-foot. The above yield is far below the average, although the amount of water used was about the same as during average years. Mr. Hardman explains the circumstance as the result of his having had to shut off the water for about ten days during the month of May. He states that the grass then received a setback from which it failed to recover. The usual crop is in the neighborhood of 1 ton to the acre, which would make the value of the water in normal years about six times that found above.

It would seem, however, that none of these results represent the value of water as used in the entire district according to the estimates of the pecuniary loss due to the shortage of water during the past season. But, whatever may be the value of water so used, from an economic standpoint the present method of using water upon the hay meadows appears to be extremely wasteful. The land is seldom if ever smoothed and leveled to facilitate irrigation. Contour ditches are often run to the higher knolls, but the usual practice is to bring the water to the highest portions of the land irrigated and then let it run for several weeks continuously without attention. The natural result is that the low-lying portions of the meadow are flooded, while the higher portions are left completely dry except for such moisture as rises from the lower portions. Many of the meadows were originally range or dry pasture lands which have been transformed into meadows by the application of water. The native grasses which are common to such land, and which probably would be greatly stimulated to growth by a moderate amount of water, are literally "drowned out" by the excessive amounts applied in actual practice. These native grasses, such as needle grass, prairie June grass, and various species of blue and wheat grasses, are very nutritious and valuable as forage, but they can not thrive in the presence of such an excess of moisture, and their places are taken by vegetation suited to moist and alkaline conditions. Such are foxtail, tussock grass, alkali meadow grass, weeds of little or no value, as parsnip, plantain, Beckmannia, alkali sacaton, etc., while in the continually wet places sedges of various species, wire grass, and bulrushes thrive. The latter class of vegetation certainly makes anything but desirable hay, yet the endeavor of nearly all irrigators is to put such an amount of water upon their meadows as will completely submerge, or at least thoroughly soak, the entire area, high places included. Unless this can be done complaints are heard over the shortage of water. Undoubtedly this flooding tends to give a quantity of hay and there are some who claim that excessive amounts of water are necessary to grow any crop whatever at high elevations. While this must be true to some extent, it certainly would appear that a smaller quantity of better hay to the acre than now grown would be something very desirable, and it is possible that a meadow irrigated with moderate amounts of water and with

some care and attention in irrigation might in the end give as high a yield of the more valuable grasses as it now does of weeds, sedges, and rushes. As many of the meadows along Sand Creek have been irrigated in the manner described for a number of years and as the vegetation is of the moisture-loving variety, a scarcity of water such as that experienced during the past season results in a greatly diminished yield of hay.

DITCHES.

Undoubtedly much of the difficulty experienced in the distribution and economical use of water in districts similar to the one under consideration results from the fact that each ranchman owns and controls his own ditch system. Several ditches are often built upon one ranch, each irrigating from 50 to 200 acres. The total length of ditches in the whole Sand Creek district amounts to only 32.5 miles, being no more than a system of laterals under some large canal. Yet each ditch, however small, has its own separate priority, and its control must be subject to the same State supervision as would a large canal. The same problems of water administration are therefore encountered upon Sand Creek as would be met with upon a stream of ten times its size and importance.

The system of small separate ditches results in the double disadvantages of limiting the area capable of irrigation and a low duty of water. Through most of its length in Wyoming Sand Creek has an unusually slight fall; so that in order to irrigate relatively small areas a long length of ditch is required. As ditch construction is expensive, the area which a ranchman is able to reclaim by his own efforts is necessarily small. A line of main canal or ditch on either side of the valley, diverting water from the creek near the point where it empties into the valley, besides commanding the land now watered, would make it possible to irrigate a much larger area. Built on the cooperative plan, as in other portions of the West, and under cooperative management, such a system would also allow of greater economy in the use of water through distribution in rotation. Such a project, although favored by a few ranchmen who see its advantages, is opposed by the majority, who are disinclined to abandon their present ditches and water rights and who fear the advantages to be gained will not be commensurate with the expense of such an undertaking. In the near future, however, it is probable that some more effective means of distribution, together with storage of the remaining water supply, must be resorted to. The ditches in the Wyoming portion of the district are worthy of but very brief mention. The largest, the Lone Tree Ditch, is but 10 feet wide and 2 feet deep. The grades of the various ditches are from 4 to 10 feet per mile. No irrigation structures of interest or importance are found. A few of the ditches have no headgates, little or no regulation being made. No measuring weirs or flumes are found in the district.

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SEEPAGE.

Seepage undoubtedly has much to do with the duty of water and with the distribution of water from the stream. The soil being of a porous character, it is to be expected that the seepage gains and losses will be large, and this is what was found by a series of measurements made the past season.

The diagram (fig. 3, p. 110) shows graphically the total flow of the different ditches previously mentioned, as well as the flow of Sand Creek at the upper and lower gaging stations, from the 25th of April, at which time irrigation started, to the end of July. This diagram shows that on several dates the amount of water used by the different ditches exceeded by several acre-feet that passing the upper gaging station, while at the same time a small amount was flowing at the lower gaging station. It has been explained that the soil is very porous and that much of the land irrigated is in the stream bottoms or upon the hillsides immediately adjacent to the creek. Much of the water applied to the land probably returns to the stream and becomes immediately available for the use of ditches diverting water lower down. To determine to what extent this occurs measurements were made of the flow of Sand Creek just above and just below the meadow of Mr. Hardman. We have elsewhere stated that the use of water upon this meadow more nearly represented the ordinary use than did any other upon the stream during the past season. It must be expected, therefore, that such results as were obtained from the seepage measurements would likewise be representative.

The results are shown in the following table:

[illegible]

The first set of these measurements was made soon after water was turned on the meadow, and it is probable that the ground had not become sufficiently saturated to cause much seepage. The second set was made some time after water had been turned on and shows a large increase in the ratio of seepage to the amount of water applied. The third set was made when the meadow was dry, and consequently there was only a very slight difference between the two measurements.

In addition to the above, three series of measurements were made to determine the effect of seepage upon the stream flow in a certain length through the valley. In the section selected, which was about 18 miles in length, no visible inflow from tributary streams occurred during the progress of the respective measurements. The results are shown in fig. 4. This diagram shows the net gain or loss between the respective points of measurement. All diversions have been subtracted.

The first measurements of the series were made on May 25. At this

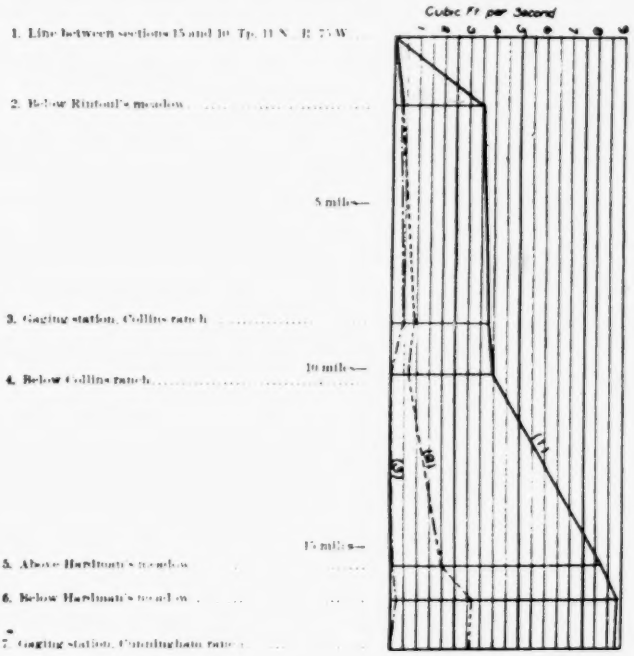

FIG. 4.—Diagram showing seepage gains and losses in flow of sand Creek.

time water was being used very generally throughout the valley in large quantities and the seepage, as shown by the diagram, is correspondingly large. The second set, being taken in the season when water was not so abundant, shows a corresponding decrease in the seepage, and the last, taken when but little water was being used, indicates that very little water was returning to the stream. Between the three measurements there seems to be a very satisfactory correspondence, so that the results are probably accurate.

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The above considerations seem to show quite conclusively that were it not for the fact that a great deal of the water used returns to the stream the area which could be irrigated would be much smaller. As we have elsewhere stated, no data is available as to the flow of the stream in normal seasons. From the high-water marks and from the testimony of the residents of the district as to the levels attained by the stream in flood time we are, however, able to estimate that the flood discharge is probably between 75 and 100 cubic feet per second. Upon the legal basis of 70 acres per second-foot (which we have reason to believe is too high a duty for this district) the total area capable of being irrigated in flood time would be only about 6,000 acres. The actual area under ditches is about 5,000 acres, from which it is seen that the flow of some of the lower ditches in dry or even in normal years must be made up almost entirely of seepage water.

THE INTERSTATE WATER-RIGHT PROBLEM.

The legal phase of the irrigation problem in this district is of unusual interest and importance. It involves the question of interstate rights, a question which is very intimately connected with future irrigation development on many of the larger streams of the West.

As may be seen from the accompanying map (Pl. VI), Sand Creek rises in Colorado and about half of its course lies in that State. Nearly all of the irrigated land, however, lies in Wyoming. Much of this land has been under irrigation since 1878, and a smaller portion since about 1870.

Nearly all of the land lying in Colorado watered from Sand Creek has been under irrigation for probably not over ten years, though a small portion has been watered for perhaps twenty years. The irrigation of this land has never very seriously interfered with the use of water by the Sand Creek appropriators in Wyoming. The land irrigated has a steep slope toward the stream, and the return seepage is large, as shown by the diagram (fig. 4, p. 114), in which the seepage gains from these lands are shown between points 1 and 3. Although the use of water by the Colorado appropriators might diminish the present flow of the stream, the ultimate result would be that the drainage from these lands would tend to sustain the flow later in the season, probably, however, too late to be of material aid in irrigation. This influence of seepage has been recognized by the Sand Creek ranchmen, and consequently no complaint has been raised previous to this time against the use of the waters of the stream by these Colorado appropriators, although their rights are inferior in time to those of many of the ranchmen along Sand Creek in Wyoming.

In May of 1902, however, a canal was completed high up on a stream in Colorado by which it was made possible to divert the entire

flow of Sand Creek at the point of diversion and empty it into Sheep Creek, a tributary of the Cache la Poudre River, an important Colorado stream lying in the drainage basin of the South Platte River. (Pl. VII.) The water diverted from Sand Creek is subsequently diverted from the Cache la Poudre River and stored in a reservoir from which it is afterwards drawn to irrigate beet lands in the vicinity of Fort Collins. The ditch thus connecting the two watersheds is called the Divide Ditch. Although this year the flow of Sand Creek alone has been utilized, the works have now been completed by which during the coming season the headwaters of a number of streams tributary to the Laramie River will be diverted into the Sand Creek watershed and then with Sand Creek water emptied into the watershed of the Cache la Poudre. The chain of ditches by which this unique scheme is carried out is shown on the accompanying map. (Pl. VI, p. 100.) As will be seen by the map, the whole system lies in Colorado. The water is both diverted and used in that State.

It is of course evident that this diversion of water from one watershed to another brings about a number of complications of a legal nature. The Sand Creek water and also that flowing into the Laramie River by other channels has already been appropriated and put to beneficial use by both Wyoming and Colorado citizens whose ranches are situated upon the streams in question below the respective points of diversion of the ditches mentioned. While the Colorado appropriators whose interests are thus affected have redress in the courts of their own State, the Wyoming citizens have no means of maintaining their rights except by an appeal to the United States courts. Such an appeal has been made by the Sand Creek landholders whose interests are affected. The following is extracted from the bill of complaint filed by their counsel:

> In 1867 and the succeeding years and long prior to the acts of the defendants hereinafter complained of the plaintiffs and their respective grantors began to cultivate their said lands and to produce and harvest crops of grass and hay and other crops thereupon, originally by natural irrigation from the waters of Sand Creek, and later by artificial diversions by means of dams, ditches, flumes, and other works made for the purpose of extending and improving the irrigation of such lands and by such and other means of diversion and by the application of the waters of said creek to the soil, and through the cultivation thereof the plaintiffs and their respective grantors made appropriations and acquired rights prior in time to those of the defendants to the use of all of the waters of Sand Creek, which appropriations and rights they have maintained up to the present time, and of which they are now in possession and enjoyment except as interrupted by the wrongful acts of the defendants hereinafter complained of.
>
> Adjacent to the irrigated lands of the plaintiffs are large areas of arid pastoral lands both in public and private ownership, upon which the cattle of the plaintiffs and their grantors have been accustomed to range and graze from 1867, being dependent for the use of such pasturage upon the access to the running waters of said creek, without which the pastoral lands aforesaid would be largely inaccessible and useless.
>
> From 1867 the plaintiffs and their grantors have been accustomed to draw their

FIG. 1.—HEAD GATE AND DAM OF DIVIDE DITCH

FIG. 2.—VIEW OF DIVIDE DITCH, SHOWING LOSS BY SEEPAGE

water supply for domestic purposes from said creek, and the plaintiffs are now largely dependent upon such source of supply.

The defendants, on or about May 1, 1902, and at divers times from that date to the filing of this bill, have, by means of dams and ditches and otherwise, wrongfully and unlawfully obstructed and diverted the flow of the waters of said creek and its tributaries and drainage basin, the common source of supply, and intercepted the melting snows and the floods and rains of said drainage basin and led them away from the channel and in some instances from the drainage basin of said creek and wasted and applied them to other uses, thereby cutting off the flow of the said stream into Wyoming and to the plaintiffs' ditches and lands and depriving the plaintiffs of all use of said waters; and the defendants still repeat and continue and threaten to further and permanently repeat and continue their said wrongful and unlawful acts to the permanent injury and deprivation of the plaintiffs' source of supply, and, unless restrained by the order of this court, the defendants will thus further and permanently injure and deprive the plaintiffs of their said source of supply.

The diversions and applications of water by the plaintiffs, as aforesaid, are wholly within the State of Wyoming, and the diversions and applications of water aforesaid by the defendants are wholly within the State of Colorado.

The plaintiffs are informed and verily believe that the defendants claim and pretend, by reason of the interstate character of said stream and by reason of the diversity of citizenship and the location of lands of the plaintiffs and those of the defendants in different States, that the defendants have the right to wholly exclude the plaintiffs from the use of the waters of said creek and to take and apply and appropriate, in Colorado, all of the waters of said creek in disregard and exclusion of the vested and acquired prior rights of the plaintiffs aforesaid, and the defendants deny and dispute all rights of the plaintiffs to make any appropriation or use of the waters of said creek without the limits of Colorado, and claim all of the said waters as lands granted by the constitution and laws of Colorado exclusively to the citizens and occupants of lands in said State.

The plaintiffs have no other practicable or available supply of water, and the aforesaid obstructions and diversions by the defendants of the waters of said creek have deprived and now deprive and will, if repeated or continued, further deprive the plaintiffs of the necessary supply of water for their cattle and for the irrigation of their lands and for domestic uses, and have greatly reduced the growth of crops and will, if repeated or continued, cause the plaintiffs' irrigated lands to deteriorate and relapse into a state of aridity and barrenness which will wholly or largely destroy their value and thus deprive the plaintiffs of their property, and will, if further repeated or continued, render the pastoral lands aforesaid, both of public and private ownership, inaccessible and useless for grazing purposes.

The complaint asks to have the defendants cited to show what rights they claim and also to have them restrained from future diversion of water.

It is, of course, outside of the province of this report to discuss the respective rights of the parties to this suit. That the Wyoming ranchmen have just grounds of complaint can not, however, be denied. Although they have been settled upon the stream a sufficient length of time to acquire rights which would hold against parties diverting water above them were the stream entirely within their own State, in this case they suddenly find themselves deprived of a large portion of the waters of the stream upon which their prosperity almost entirely depends, and they have no means of redress except by an appeal to the Federal courts. The damage sustained by them through the diversion of the waters of the stream is difficult of determination. From

the data at hand it is, however, comparatively easy to arrive at an approximation to the truth.

As the Divide Ditch alone was completed during the past season no water was diverted from the other streams flowing into the Laramie River. As we have stated elsewhere, the shortage of water during the past season was due not only to this diversion of Sand Creek water by Colorado parties, but also to an unusually dry season. From January 1 to June 28 there was little or no rainfall, and, to make matters worse, there was only a very slight amount of snow stored in the mountains and it was almost entirely melted by the end of May. The precipitation from October 1, 1901, at which time the investigation was started, up to October 1, 1902, is given in the following table, as well as an average for the same period during a previous ten years.

Rainfall at Laramie, Wyo., from October, 1901, to September, 1902, inclusive.

Month.	1901-1902.	Average previous ten years.*	Month.	1901-1902.	Average previous ten years.*
1901.	*Inches.*	*Inches.*	1902—Continued.	*Inches.*	*Inches.*
October	1.28	0.83	May	.28	1.75
November	.00	.27	June (12, 0.03; 28, 0.49; 29, 0.08)	.60	1.20
December	.21	.36	July	1.49	1.47
1902.			August	.40	1.06
January	Trace.	.27	September	1.58	.67
February	.28	.34			
March	.41	.97	Total	7.29	10.49
April	.80	1.31			

* Excluding 1901, for which records are incomplete.

From this table it is seen that the rainfall during the period under consideration has been about three-fourths the mean of the previous ten years. It is seen further that from March to July, 1902, a period during which rain is much needed, both for irrigation and for the ranges, that there was only 1.66 inches of rainfall against a normal of 4.25 inches during the previous years, and that of this 1.66 inches 0.57 inch fell on June 28 and 29, too late to do much good to the hay meadows.

These figures are from the records of the meteorological department of the University of Wyoming, which is near enough the district under discussion to make the data probably very nearly correct for that locality.

The relative effect of the two causes mentioned on the shortage of water this season can not be stated with any exactness. The water diverted by the Divide Ditch is, of course, lost to the users of water farther downstream. As it is carried to another watershed only the small amount lost in transit prior to the ditch reaching the other watershed can return to the stream by seepage. The flow of Sand Creek was undoubtedly affected also by the reduced flow, due to shortage in

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precipitation of several large feeders entering the stream below the head of Divide Ditch.

The variation in the discharge at the upper gaging station when the head gates of the ditch were opened or closed give some idea of the influence exerted upon the flow of Sand Creek by the use of Divide Ditch. On May 9 the water was turned into the Divide Ditch for the first time. On May 11 the discharge at the upper rating flume on the creek was 59 acre-feet per day. On May 12 the discharge fell to 38 acre-feet per day.

In the following table is given a record of the flow of the Divide Ditch from May 9 to July 1, 1902. These figures were obtained by the daily gage readings at the lower end of the ditch just before it discharges into Sheep Creek. From May 9 to June 10, inclusive, measurements were made by means of a rectangular weir of rather imperfect construction. On June 10 a rating flume was installed, in which the measurements were afterwards made.

Flow of Divide Ditch.

Day	May		June		July	
	Average discharge in cubic feet per second.	Discharge in acre-feet per day.	Average discharge in cubic feet per second.	Discharge in acre-feet per day.	Average discharge in cubic feet per second.	Discharge in acre-feet per day.
1	.....	.....	22.30	44.16	1.70	3.37
2	.....	.....	19.20	37.91	1.90	3.76
3	.....	.....	15.00	29.70	1.20	2.38
4	.....	.....	14.40	28.62	1.20	2.38
5	.....	.....	14.40	28.40	.97	1.93
6	.....	.....	14.40	26.54	.48	.94
7	.....	.....	13.40	26.54	.20	.40
8	.....	.....	11.90	23.57	.20	.40
9	7.90	15.44	9.90	19.71	.32	.64
10	12.90	25.45	7.67	15.19	.20	.40
11	16.60	32.88	6.75	13.36	.00	.00
12	18.20	36.29	5.62	11.13	.00	.00
13	30.70	60.89	4.49	8.90	.00	.00
14	25.30	50.08	5.62	11.13	.00	.00
15	35.80	70.89	4.49	8.90	.00	.00
16	30.70	60.89	4.49	8.90	.00	1.19
17	31.80	62.07	3.81	6.54	.75	1.48
18	25.00	51.18	2.21	4.36	.75	1.48
19	22.20	44.05	2.21	4.36	.45	.90
20	18.90	37.42	2.21	4.36	.32	.65
21	16.60	32.87	2.21	4.36	.20	.40
22	17.70	35.15	2.21	4.36	.15	.30
23	16.90	33.46	1.59	3.16	.00	.00
24	16.10	31.98	1.59	3.16	.00	.00
25	16.10	31.98	1.20	2.38	.00	.00
26	20.00	39.70	1.20	2.38	.00	.00
27	24.10	46.72	1.20	2.38	.00	.00
28	22.30	44.16	1.20	2.38	.00	.00
29	23.40	46.50	2.20	4.36	.00	.00
30	22.30	44.16	1.59	3.16	.00	.00
31	21.10	41.88	.....	.....	.00	.00
Total	.....	976.12	.....	394.36	.....	23.01

As shown by the table, a total of 1,393.49 acre-feet of water was diverted from Sand Creek and emptied into Cache la Poudre watershed in 1902. This amounts to about 60,700,000 cubic feet. The value of this water as sold in Colorado is $100 per 1,000,000 cubic

feet, which would mean that the water thus diverted was worth $6,070 to the owners of the Divide Ditch. This water would have had much less value as used in Wyoming. As shown on page 110 the average value of an acre-foot of water used in the Sand Creek district is not far from $1, figured from the yield per acre in hay. On this basis the Wyoming appropriators sustained a loss of $1,393.49. This is not, however, the only loss. It is not only the damage resulting from the shortage in the hay crop that must be considered, but also the permanent depreciation in the value of the land resulting from the lack of water for its irrigation. Land under irrigation is valued by the Sand Creek ranchmen at from $10 to $25 per acre. The average value as placed by them is $15 per acre. Land without water they value at about $2 per acre; fencing they value at $50 per mile, which would make the value of an acre in a fenced but unirrigated section about $2.30. Thus there would be a depreciation of $12.70 per acre in the value of land should the water supply be entirely cut off. We have elsewhere explained that it was quite impossible to make any determination of the actual area to which water was applied because of the unequal and uneven manner in which the land was irrigated. Water was let into all of the ditches ordinarily used, so that under none of them could it be said that absolutely no water was applied to the land. It is therefore utterly impossible to determine just how much land was without water during the past season. The only way in which it is possible to make even an estimate is to assume that the entire area under ditches could have been irrigated had the water diverted by the Divide Ditch been available for the use of the Sand Creek ranchmen. By a proportion between the amount of water actually available, that which would have been available had the Divide Ditch not been built, and the total area under ditches in the Wyoming portion of the district we may arrive at some approximation to the truth. The total area under ditches is about 5,000 acres. The amount of water which entered the upper portion of the valley from the 1st of April to the last of June, at which time irrigation may be considered to have ended, was 1,735.99 acre-feet. The amount of water diverted by the Divide Ditch during the same period was 1,370.48 acre-feet. The total amount of water which would have been available, therefore, was 3,106.47 acre-feet. By proportion, the amount of land which probably was irrigated the past season is found to be 2,794 acres. This means that 2,206 acres were without water. If the past season be taken as typical and the decrease in the water supply as permanent, then, on a basis of depreciation of $12.70, there was a loss of $28,016.20.

Combining the permanent depreciation of $28,016.20 in the value of land that was deprived of water with the loss for the season of $1,393.49, the value of the 1,393.49 acre-feet diverted, it is seen that

the total loss caused by the Divide Ditch diversion estimated at the close of the season of 1902 was $29,469.69. This loss is surprising when it is considered that it occurred in a district where the total assessed valuation of real estate and improvements is only $112,000.

RANGE PROBLEMS.

On Sand Creek, as indeed nearly everywhere throughout the State of Wyoming at the present time, the question of the use and control of the grazing lands adjacent to the stream is of the greatest complexity and importance and the situation is one demanding the early attention of our legislative bodies.

It is unnecessary to dwell at much length upon the present condition of the ranges or the causes by which the present situation has been brought about, as the facts are widely known. In this district, as elsewhere, the entire difficulty may be said to have originated in the short-sighted endeavor of the early stockmen to make the most of the "free grass" while it lasted, regardless of consequences. During the "boom times" of the cattle business, from 1871 to 1885, stockmen invested in immense herds of cattle, which were allowed to roam at large and which were more in numbers than the range could support without injury. Because of the presence of water easily available for stock the Sand Creek country suffered probably as much injury as any from the excessive trampling and close cropping of the pasturage by the great herds of the speculative stockmen. From this early impoverishment the range has never fully recovered, although after the decline of the range stock industry in the latter half of the eighties the number of cattle occupying the ranges was greatly reduced. According to the testimony of ranchmen who have been in the district since its first settlement, many areas which now have only sparse and scattered growth of vegetation, consisting mostly of cactus, formerly had comparatively thick covering of grass, which, in favorable seasons, grew to the height of a man's knee. The difference between former and present conditions can probably best be realized when it is learned that on areas which formerly could support from 50 to 100 animals per square mile without crowding there is now barely feed enough for 20, or at best 30. Sheep have never been grazed very extensively in this district, so that such damage as has been done is very largely that due to overstocking by cattle. This exhaustion of the natural pasturage, together with the wholesale fencing and use of the remaining public lands by the large cattle owners, has left the ranchmen of moderate means in serious straits for the summer and winter pasturage of their cattle. On some ranches enough hay is grown to feed during the winter many times the number of cattle which can be supported by grazing on the adjacent ranges during the summer.

It is probable that in this locality the range might be restored to its

former condition by artificial seeding and a simple course of cultivation. The most practicable way, however, seems to be to let conditions correct themselves naturally, allowing the few remaining grasses to reseed the denuded areas and protecting the new growth by a careful and conservative system of pasturing. This remedy is evident to most ranchmen, and explains the efforts which now and for some time past they have been making to acquire inclosed tracts of grazing land. From these tracts they are enabled to exclude the cattle of their neighbors, and in them they pasture their own cattle in a way which will be most likely to induce a rapid and permanent improvement in the pasturage. This separate control of grazing areas also allows the improvement of the herds by the use of pure-bred stock, something which would be impossible under the old open-range system.

Ranchmen favor the enactment of some law by which they could lawfully acquire areas of grazing land over which they could exercise control for a term of years sufficiently long to justify them in using such means as are effective in reestablishing the growth of the native grasses. Realizing the great importance of safeguarding the interests of the small stockmen, they believe it to be necessary to prevent the possibility of the large cattle companies gaining a monopoly over large areas of grazing lands. Such an end would, in the opinion of many, be attained by making the area of grazing land obtainable bear a certain proportion to the area of irrigated land; for example, 1 acre of irrigated land should entitle the landowner to 5 acres of grazing land. However, the problem is one of many complexities, and to solve it in a way which shall be satisfactory to all the various interests concerned will be a task of much difficulty.

CONCLUSIONS.

Although many results of the investigations of the past season can not be taken as representative of normal conditions, still it is thought that the following conclusions can safely be drawn:

(1) That in the irrigation of native hay a wasteful and extravagant use is made of water which might be used to better advantage if less were applied, or which, if used in the irrigation of some forage crop such as alfalfa, would give a much larger yield for the same amount of water judiciously applied.

(2) That native hay is probably, however, the only crop which could be grown with profit without storage of the water supply. The period of greatest use in the irrigation of native hay is the period of maximum supply, and the supply becomes exhausted at a time when crops other than native hay most need the water.

(3) That the system of numerous small ditches, besides restricting the area capable of irrigation, produces unnecessary complications in water distribution and favors a low duty of water.

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(4) That seepage has a surprising influence in keeping up the flow of ditches whose head gates may be separated by only a few miles of irrigated land.

(5) That by diversion of the headwaters of Sand Creek into another watershed Wyoming irrigators will be deprived of a large portion of the late spring flow of the stream, which comes mainly from the meltings of snow accumulated in the higher valleys of the mountains and is therefore all the more valuable for irrigation.

(6) That conditions of which we have an instance in the Sand Creek district demand immediately some judicial or legislative action defining the respective rights of parties irrigating from the same stream but separated by a State boundary.

(7) That the present depleted condition of the natural pasturage and the trend of the cattle industry toward improved breeds of cattle have rendered obligatory the abolishment of the open range in this district.

(8) That as the area of the homestead and desert land claims are inadequate to support a profitable number of cattle, the adjacent areas of public land should be rendered available by leasing, or some other means, for exclusive use and control by resident landowners, with certain restrictions as to the amount and location of land available.

Date	Cts den 12 1902			$	¢	Date	Marts og April 1902		$	¢
			den 10			S 30	16 1/2	1 Dag	1	25
10		1/2 Dag			62	M 31	20 Dolar	1 —	1	25
11	12	1/2 —		1	25	T 1	April	1	1	25
12	1/2	—		1	25	O 2		1	1	25
13	3/4	—		1	25	T 3		1 —	1	25
14		1 —		1	25	F 4		1	1	25
15 F	204	34			93	L 5		1	1	25
16	125	2 9/2				S 6				
16 L	16	2				M 7		1 —	1	25
17		1/2			62	T 8		1 —	1	25
18	125	1		1	25	O 9		1 —	1	25
19 O		1		1	25	L 10		1 —	1	25
20 T		1		1	25	T 11		1 —	1	25
21 T		1		1	25	L 12	125	1 —	1	25
22 L		1		1	25	S 13	95	—		
23 S		1/2			62	M 14	625	1 —	1	25
24 M	199571	1		1	25	T 15	250	1	1	25
25 T	6218	1/4			31	O 16	31,25 for	1 —	1	25
26 O	2001	1/4			31	T 17	April	1	1	25
27 T	15 1/2	1/2			62	F 18	1862	1	1	25
28 T	125	3/4			93	L 19	312	1 —	1	25
29 L	12	1/2			62	S 20	4984			
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	125			18	13					

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Date	April 1902	Day	$	¢
M 21		1/2		62
Tu 22		=		
O 23	125	1	1	25
T 29	21	1	1	25
F 25	125	1	1	25
L 26	250 / 2625	1	1	25
S 21	4982 / 7492	1/2		62
M 28	250 / 5125	1	1	25
Tu 29		1	1	25
O 30	25 Dage	1	1	25
	May 1902			
Tu 1		1	1	25
F 2	125	1	1	25
L 3	27	1	1	25
S 4	875			
M 5	250	1	1	25
Tu 6	5375	1	1	25
O 7	62	1	1	25
T 8	3437	1	1	25
F 9	3125	1	1	25
L 10	6562	1	1	25

Date	May 1902	Day	$	¢
S 11		1	1	25
M 12		1	1	25
Tu 13		1	1	25
O 14		1	1	25
T 15		1	1	25
F 16		1	1	25
L 17		1	1	25
S 18				
M 19		1/2		62
Tu 20		1	1	25
O 21		1	1	25
T 22		1	1	25
F 23		1	1	25
L 24		1	1	25
S 25				
M 26		1	1	25
Tu 27		1	1	25
O 28		1	1	25
T 29		1	1	25
F 30		1	1	25
L 31	27 1/2 Dage	1	1	25

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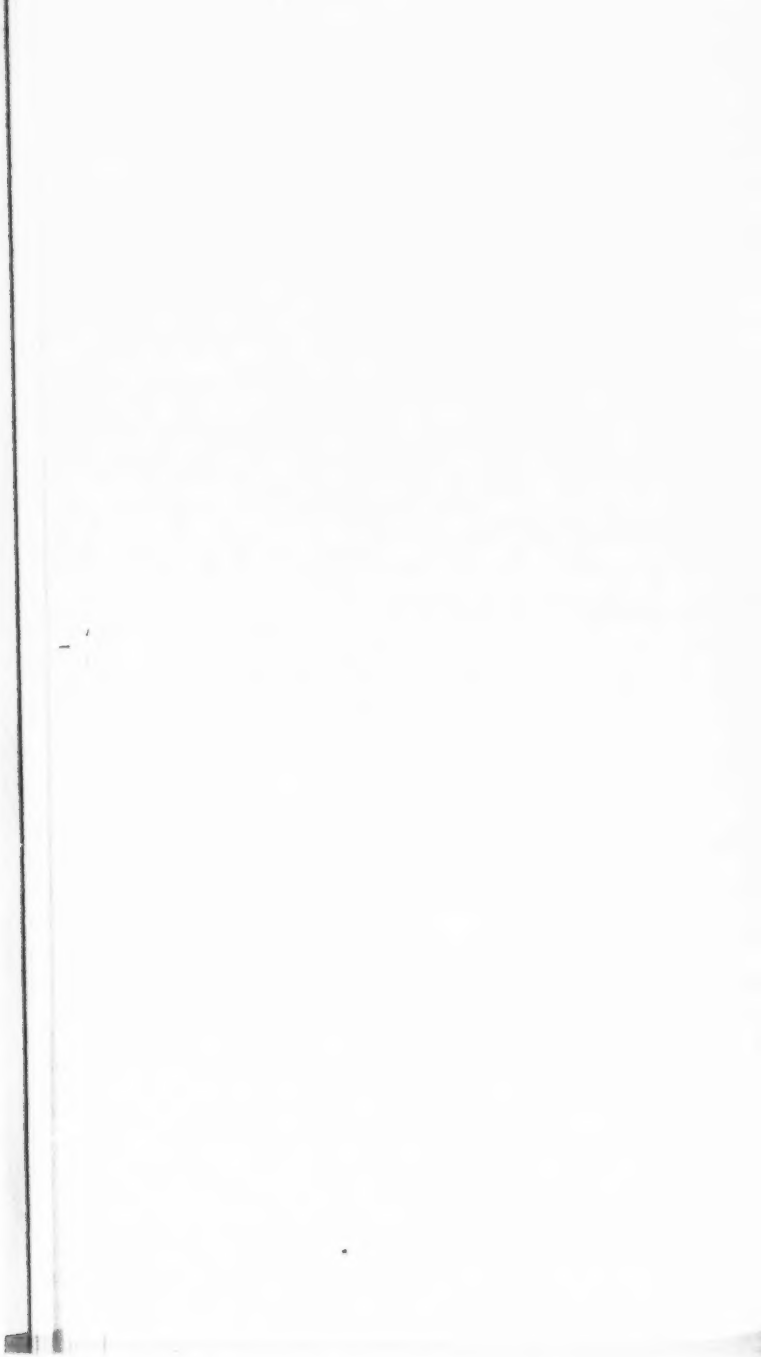
Date	June 1902	Days	$	¢
S 1				
M 2		1	1	25
T 3		1	1	25
O 4		1	1	25
T 5				
F 6				
S 7		1	1	25
S 8				
M 9		1	1	25
T 10		1	1	25
O 11		1	1	25
T 12		1	1	25
F 13		1	1	25
S 14		1	1	25
S 15				
M 16		1	1	25
T 17		1	1	25
O 18		1	1	25
T 19		1	1	25
F 20		1	1	25
S 21	16 Days	1	1	25

Date	July 1902	Days	$	¢
T 31		1		50
T 1	August	1	2	
W 2		1	2	
T 3				
F 4		1	2	
S 5		1/2	1	
S 6		1	2	
M 7		1	2	
T 8		1	2	
W 9		1	2	
T 10				
F 11		3/4	1	50
S 12		1/2	1	
S 13		3/4	1	50
M 14		1/2	1	
T 15		1	2	
W 16	15 Days	1	2	
T 17			25	50
F 18		1	2	
S 19		1	2	
S 20		1	2	
M 21		1	2	



OMMISSION
HE IRRIGATIO

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2) Season from Natural Stream	(13) Total No. of Acres that can be Irrigated	(29) REMARKS (14) Affidavits	C Statement	SOURCE OF INFORMATION, ETC.
87.2	200		2	
9.6	40			
1.8	80			
	100			
1.8	30			
0.4	160			
4.0	70			

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r, District No. 48 1353

(29)
REMARKS

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R. F. Mosier
Water Commissioner, District No.

[fol. 1354] COMP. EXHIBIT NO. 4

Articles of Incorporation of The Laramie-Poudre Irrigation Company

Know All Men by These Presents, that we, the undersigned, H. D. Parker, W. R. Kelly, and O. S. Moore, residents of the State of Colorado, have associated ourselves together as a corporation under the name and style of The Laramie-Poudre Irrigation Company, a mutual irrigation company, for the purpose of becoming a body corporate, under and by virtue of the laws of the State of Colorado, do hereby make, execute and acknowledge, in quadruple, this certificate in writing of our intention to so become a body corporate under and by virtue of said laws.

First. The corporate name and style of our said corporation shall be The Laramie-Poudre Irrigation Company.

Second. Our corporation aforesaid shall be what is commonly known as a mutual irrigation company, not for pecuniary profit, and the waters owned by the company shall be distributed among its stockholders prorata, according to the number of shares of stock owned by each, but subject to the provision of the by-laws of the company as to payment of assessments and distribution of water.

Third. The objects and purposes for which said corporation is formed and incorporated, are to acquire, construct, own, maintain and operate, ditches and reservoirs, and interest therein; to acquire by purchase, condemnation or otherwise, all lands, necessary and proper for rights of way for said ditches and sites for said reservoirs; to acquire by appropriation, purchase, contract, lease, or otherwise, waters for supplying said ditches and filling said reservoirs; to divert and store water in said ditches and reservoirs and distribute the same to the stockholders direct, or by a system of exchange, and to use all water acquired and appropriated for irrigation, domestic, mechanical and other beneficial uses; to acquire interests in ditches and [fol. 1355] reservoirs and appropriations of water, by purchase and ownership of stock in other corporations owning or controlling the same; to construct all dams,

headgates, flumes and appliances necessary and proper to construct, maintain and operate said ditches and reservoirs; to supply water to its stockholders upon such terms as shall be fixed by the by-laws of board of directors of said company; to acquire any existing ditch or reservoir and the appropriations of water therefor, necessary or proper for the purposes of this company; to acquire, own, maintain and operate reservoirs, ditches, dams and other appliances and appropriations of water for the generation of power and other mechanical purposes, and to use the appropriations of water owned or acquired by said company for both irrigation and mechanical purposes; to purchase, acquire, own and hold, all real estate and personal property necessary to carry out and properly conduct the business of said company; to construct or acquire telephone lines, or interests in the line of any other company, by contract, holding of stock, or otherwise; to issue bonds and notes of said company and to secure the payment thereof by mortgage or deed of trust upon any or all of the property of said company, including appropriations of water; and generally, to do and perform all things necessary and proper to carry on the business of said company and to carry out its objects and purposes aforesaid.

Fourth. Among the various ditches and reservoirs and appropriations of water therefor, to be acquired, constructed and owned by said company, are the following:

1. The Rawah Ditch, whose headgate is located in the south bank of Rawah Creek in Section 32, Township 9 North, Range 76, West of the 6th P. M. in Larimer County, Colorado.

2. The Link Lakes, being a group of 14 lakes or reservoirs connected together and located in Township 8 and 9, [fol. 1356] North, of Range 76, West of the 6th P. M., Larimer County, Colorado.

3. The East Fork Reservoir, situate in Section 18, Township 8 North, Range 65, West of the 6th P. M. in Larimer County, Colorado.

4. The Laramie River Tunnel, as now constructed and located, in Sections 7, 8, 9 and 16, in Township 8 North, of Range 75, West of the 6th P. M., in Laramer County, Colorado, together with all its controlling works and other

property at both ends of the tunnel, including what is known as the Tunnel Reservoir at the west portal thereof, and all being connected with the Laramie River and diverting therefrom.

5. Deadman and Nunn Creek Ditch, or The East Side Collecting Ditch, with its headgate in the south bank of Deadman Creek, in Section 31, Township 10 North, Range 75, West of the 6th P. M. in Larimer County, Colorado.

6. The Lower Supply Ditch, or The West Side Collecting Ditch, with its headgate on the south side of Rawah Creek in Section 14, Township 9 North, Range 76, West of the 6th P. M. Larimer County, Colorado.

7. The McIntyre Ditch, with its headgate in the east bank of McIntyre Creek, in Section 31, Township 9 North, of Range 76 West of the 6th P. M., in Larimer County, Colorado.

8. Appropriations of water, from the Laramie River and tributaries thereof in Water District No. 48, pertaining to each and all of the above ditches and reservoirs, together with the following ditches taking water from the Laramie River and its tributaries in Water District No. 48, and their appropriations of water decreed thereto: to-wit: Priority No. 1 awarded to the Mansfield Ditch. Priority No. 2 awarded to Hills Ditch. Priority No. 3, awarded to the Warren Ditch. Priority No. 5, awarded to the Stuck Creek [fol. 1357] Ditch. Priority No. 7, awarded to Miller & Boswell Ditch. Priority No. 8, awarded to the Mansfield Ditch. Priority No. 9, awarded to the Yelton Ditch. Priority No. 15, awarded to the Smith-Brown Ditch. Priority No. 17, awarded to the Homestead Ditch. Priority No. 24, awarded to the Comet Ditch. Priority No. 27, awarded to the Link Ditch. Priority No. 32, awarded to the Link Ditch No. 2. Priority No. 56, awarded to the Long Park Ditch No. 2, and Priority No. 59, awarded to the Long Park Ditch.

9. Dowdy Lake Reservoir, located in Sections 27 and 34, Township 10 North, of Range 73, Larimer County, Colorado.

10. Twin Lakes Reservoir, located in Section 34, Township 10 north, of Range 73, Larimer County, Colorado.

11. Mitchell Lake System, consisting of Mitchell Lakes Nos. 1, 2, 3, 4, 5, and 6, Deer Lake, Erie Lake, Snake Lake,

and Bellaires Lake, located in Township 10 North, of Range 73, West, Larimer County, Colorado.

12. The North Pine Supply Ditch, having its headgate in the east bank of the North Branch of Lone Pine Creek, in Section 26, Township 10 North, Range 73, West of the 6th P. M., in Larimer County, Colorado.

13. The South Pine Supply Ditch, with its headgate located in the north bank of the South Fork of Lone Pine Creek, in Section 33, Township 10, North, Range 73, West, in Larimer County, Colorado.

14. The Elkhorn Ditch, with its headgate in the north bank of Elkhorn Creek in Section 12, Township 9 North, Range 74, West, in Larimer County, Colorado.

15. The Elkhorn Reservoir, to be a channel reservoir, located in the bed of the Cache la Poudre River, in Townships 8 and 9 North, of Range 72 West, in Larimer County, Colorado.

[fol. 1358] 16. The Poudre Valley Ditch, constructed with its headgate in the north bank of the Cache la Poudre River in Section 10, Township 8 North, Range 70, West, in Larimer County, Colorado, and extending thence in an easterly direction to the south line of Section 36, Township 9 North, Range 69, West, in Larimer County, Colorado.

17. The Greeley-Poudre Canal, located and constructed with its head or initial point at the terminus of the Poudre Valley Ditch in said south line of section 36, and extending thence to McGrew Reservoir in Township 9 North, of Range 65, West; also the Pierce Lateral, as located and constructed with right to enlarge the same; all located part in Larimer and part in Weld County, Colorado.

18. The McGrew Outlet Ditch, extending from McGrew Reservoir to Coal Creek, in Weld County, Colorado.

19. McGrew Reservoir, located on Sections 25, 27, 35 and 36, in Township 9 North, of Range 65, and in Section 1, Township 8 North, Range 65, Weld County, Colorado.

20. Greeley-Poudre Reservoir No. 1, located in Sections 16 and 17, Township 8 North, of Range 67, Weld County, Colorado.

21. March Reservoir, located in Section 18, Township 7 North, of Range 63, and in Sections 12 and 13, Township 7 North, of Range 64, Weld County, Colorado.

22. Dover Reservoir, located in Township 9 North, of Range 66, West, in Weld County, Colorado.

23. Also any and all ditches and reservoirs, appropriations of water, real estate and rights of way, owned by The Greeley-Poudre Irrigation District, in Larimer and Weld Counties.

24. Also any and all appropriations of water initiated, made or perfected, decreed or undecreed, for any of the ditches or reservoirs hereinbefore mentioned.

[fol. 1359] 25. Also any other ditch, canal, lateral or reservoir now constructed or which may hereafter be constructed, with the appropriations of water therefor, made or to be made, and which may become a part of the irrigation system of this company or can be used in connection therewith for augmenting the water supply of its stockholders.

Fifth. The capital stock of our said company shall consist of thirty-two thousand shares, without any par value per share, and said stock when issued fully paid up, shall be non-assessable, except that said stock may be annually assessed for the maintenance and operation of said ditches or reservoirs, and for the purpose of paying any outstanding indebtedness of the company, in the manner by law provided for a mutual not for profit ditch company.

Sixth. That at all meetings of the stockholders of the company the cumulative system of voting shall prevail as now by law provided; and in case of any change in the law, as the law shall then provide.

Seventh. The affairs and management of our said corporation shall be under the control of five (5) directors, and H. D. Parker, O. S. Moore, J. N. Agan, A. A. Edwards, and George M. Houston, are hereby selected to act as said directors and to manage the affairs and concerns of said company during the first year of its existence and until their successors are duly elected and qualified.

Eighth. The operations of our said company will be carried on in the counties of Larimer and Weld in the State of Colorado, and the principal place and business office of said company shall be located in Greeley, Weld County, Colorado.

Ninth. Our said corporation is to exist for the term of twenty (20) years.

Tenth. The directors of said company shall have power [fol. 1360] to make such prudential by-laws as they may deem proper for the management of the affairs of said company, according to the statutes of Colorado in such case made and provided.

In testimony whereof we have hereunto set our hands and seals this first day of August, A. D. 1923.

H. D. Parker, (Seal), W. R. Kelly, (Seal), O. S. Moore, (Seal).

STATE OF COLORADO,
County of Weld, ss:

I, George F. Smith, a Notary Public in and for said County in the State aforesaid, do hereby certify that H. D. Parker, W. R. Kelly, and O. S. Moore, personally known to me to be the persons whose names are subscribed to the foregoing Certificate of Incorporation, appeared before me this day in person and acknowledged that they signed, sealed and delivered the said instrument of writing as their free and voluntary act, for the uses and purposes therein set forth.

Given under my hand and notarial seal this first day of August, A. D. 1923.

George F. Smith, Notary Public. (Seal.)

My commission expires October 16, 1926.

(Here follows photolithograph of side folios 1361-1362)

9821

78078

CERTIFICATE OF INCORPORATION

OF

THE LARAMIE - POUDRE

IRRIGATION COMPANY.

DOMESTIC

(Non profit amended Dec 4)

FILED in the office of the Secretary of State, of the State of Colorado, on the 4 day of Dec proof A. D. 1923, at 11:50 o'clock A M.

CARL S. MILLIKEN,
Secretary of State.

By ——— Deputy.

Filing Clerk Leahy Fees 7.50

BOOK 224 PAGE 33

[fol. 1363] COMP. EXHIBIT No. 5

Statement of Claim to Water Right—Irrigation Division Number One, Water District Number 48

STATE OF COLORADO,
County of Larimer, ss:

I, Philip Wilson, the owner of the following described ditch, in compliance with the requirements of the provisions of General Section No. 1720 of the General Statutes of the State of Colorado approved April 20th, 1887, and the acts amendatory thereto, do hereby make this statement for filing:

1. The name of the owner of said ditch is Philip Wilson, whose postoffice address is Fort Collins, County of Larimer.

2. The name of said ditch is the Wilson Supply Ditch.

3. Said ditch is located as shown by plat hereto attached and made a part hereof with head gate at a point on Deadman Creek which bears due north of S. E. corner of Sec. 15, Township 10 N., R. 75 West 750 feet and having gate discharging water into Sand Creek at a point on the south bank thereof which bears due north from the quarter corner on the south side of section nine in township ten north, range seventy five west in said Larimer County, 1480 feet, at which point said Sand Creek assumes a well defined channel; said ditch thence following the bed of said Sand Creek to a point which bears south fifty three degrees west from the quarter corner on the west side of section twenty three in township eleven north, range seventy five west in said Larimer County 370 feet, at which point is located a head gate by which the water hereby appropriated is diverted from said Sand Creek. It being the intention hereby to appropriate all of the water from Deadman Creek which naturally finds its way into the ditch herein described and the water from the streams, valleys and natural depressions intersected by said ditch and lying above the same, and all water of Sand Creek which now reaches the headgate last above described not heretofore appropriated. It being also the intention hereby to divert the water herein appropriated from the watershed of the Big Laramie River

[fol. 1364] into the watershed of the Cache la Poudre River as shown on accompanying plat.

4. The length of said ditch is 7½ miles.

5. The width of said ditch on the bottom is 10 feet, for first 13,145 feet, and 20 feet after leaving Sand Creek.

6. The width at high water line is 16 feet, for first 13,145 feet and 28 feet after leaving Sand Creek.

7. The depth of water carried in said ditch is 3 feet for first 13,145 feet and 4 feet after leaving Sand Creek.

8. The grade of said ditch is 5 feet per mile.

9. The carrying capacity of said ditch is 117 cubic feet per second of time for first 13,145 feet and 288 cu. ft. per second of time after leaving Sand Creek.

10. Work was commenced on said ditch on the eleventh day of June A. D. 1897.

Witness my hand and seal this 21st day of July, A. D. 1897.

(Signed) Philip Wilson.

STATE OF COLORADO,
Larimer County, ss:

Rollin Q. Tenney being first duly sworn, on oath says that he has read the above and foregoing statement and examined the plat thereto attached, and that the matters therein set forth are true of his own knowledge.

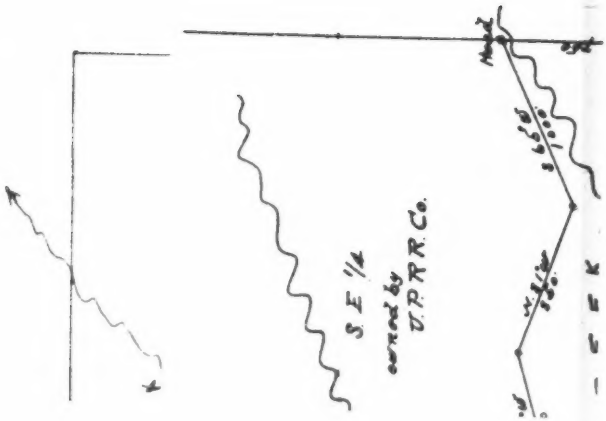
(Signed) Rollin Q. Tenney.

Subscribed and sworn to before me this 21st day of July A. D. 1897.

(Signed) Charles F. Davis,
(Signed) Charles F. Davis, Notary Public. (Notarial Seal.)

My commission expires August 18th, A. D. 1900.

(Here follows photolithograph of map, side folio 1365)



FOLD-OUT IS TOO LARGE TO BE FILMED

[fol. 1366] State Engineer's Office, Denver, Colorado.

I, M. C. Hinderlider, State Engineer of the State of Colorado, do hereby certify that this is a true and correct copy of the map and statement of the Wilson Supply Ditch (1 blueprint and 2 typed sheets), filed in this office on the 23rd day of July, A. D. 1897, and numbered 33 in W. D. #48.

Given under my hand and official seal this 14th day of April, A. D. 1933.

M. C. Hinderlider, State Engineer, By C. C. Hezmalhalch, Deputy. (Seal.)

[fols. 1367 & 1368] (Endorsed:) 33. Wilson Supply Ditch. Division No. 1, District No. 48. Claimant, Philip Wilson. Filed in the State Engineer's Office at Denver, Colo., July 23, 1897, 9 A. M. John E. Field, State Engineer. Wilson Supply Ditch. Statement.

(Here follow photolithographs of Comp. Exhibits 6, 7, 8, & 9, side folios 1369 to 1372, inclusive)

COMPLAINANT'S EXHIBIT 7

1370

Westside Collecting

COMPLAINANT'S EXHIBIT 9

1572

[fol. 1373] COMP. EXH. No. 10

Deadman Feeder Ditch

Current Meter Measurements of Water Diverted from the Headwaters of Laramie River to Sand Creek

By Goyne Drummond, Civil Engineer

These measurements made for and under the direction of the State Engineer of the State of Wyoming

Year	Month & Day	Gage height in feet	Discharge in second feet	Remarks
1929	July 10	0.15	3.12	Drummond and Meeker
	" 18	....	2.10	
1930	May 24	0.20	7.08	
	" 29	0.30	13.63	
	June 4	0.22	9.69	
	" 9	0.23	10.54	
	" 13	0.20	6.39	
	" 19	0.18	5.09	
	" 24	0.13	3.19	
	" 27	0.10	2.48	
	July 3	0.09	1.73	
1932	June 16	0.84	25.02	Drummond and Watson, Whiting and Greenwood in party.

(Here follow photolithographs of Comp. Exhibits 11, 12, 13, 14 and 15, side folios 1374 to 1378, inclusive)

COMPLAINANT'S EXHIBIT 11

COMPLAINANT'S EXHIBIT 12

COMPLAINANT'S EXHIBIT 13

1276

COMPLAINANT'S EXHIBIT 14

1577

COMPLAINANT'S EXHIBIT 15

[fol. 1379] COMP. EXH. No. 16

State of Colorado,

Engineering Department,

Denver

Addison J. McCune, State Engineer; R. G. Hosea, Deputy; J. Harold Baily, Chief Hydrographer.

March 14th, 1923.

Agnes Zimmerman, Home, Colorado.

DEAR MISS ZIMMERMAN:

Replying to your letter of the 7th inst. in which you ask as to whether or not Laramie and Lost Lakes have been covered by filings.

I have searched through the records and have been unable to find filing covering these specific locations. From available data we have here these lakes are in the Laramie River water shed and at this date would not be subject to appropriation on account of the Wyoming-Colorado water suit.

I am returning the topographic map enclosed in your letter.

Yours very truly, C. C. Hezmalhalch, Chief Clerk.

CCH/bc.
Encl.

[fol. 1380] COMP. EXH. No. 17

STATE OF COLORADO,
County of Denver, ss:

I, M. C. Hinderlider, State Engineer of the State of Colorado, do hereby certify that after a careful study of the certified copies of decrees on file in this office for Water Districts 3, 47 and 48 of the State of Colorado, I am unable to find any decrees having been awarded to either Lost Lake or Laramie Lake.

Given under my hand and official seal this 20th day of February, A. D. 1925.

M. C. Hinderlider, State Engineer, by C. C. Hezmalhalch, Deputy. (Seal.)

(Here follow photolithographs of Comp. Exhibits 18 and 19, side folios 1381 and 1382)

9304

COMPLAINANT'S EXHIBIT 18 Z-28

NDERLIDER
ATE ENGINEER
ZNALNALCH
PUTY
LD BAILY
EF HYDROGRAPHER

STATE OF COLORADO
ENGINEERING DEPARTMENT
DENVER

EXHIBIT NO. 18

December 11,1926 SUBJECT:

Miss Agnes Zimmerman,
Home, Colorado.

Dear Miss Zimmerman:-

In further reply to your recent inquiry as to the records of foreign diversions into the Poudre River the past year, we have to advise that we are just in receipt of the automatic register charts on the following streams for the following years:

Grand River Ditch, 1923-1926
Michigan Ditch, 1923-1926
No.Poudre Canal, 1923-1926
Laramie River, 1923-1926
Laramie River Tunnel, 1926
Cameron Pass, 1923-1926
Sand Creek, 1923-1926
Canal No. 3, 1926
Lost Lake, 1923.
Lindermier Outlet, 1923 & 1926
Twin Outlet, 1923 & 1926
Doudy Reed, 1923 & 1926
Bob Creek, 1925-1926
Columbine, 1925&1926

Some of these records are not entirely complete and the records prior to the dates shown hereon have been destroyed according to information furnished by the Water Commissioner of District No. 3.

The records hereinmentioned are on file in this office subject to inspection by you at any time.

Very truly yours,

M C Hinderlider
State Engineer.

EH/bc

1361

9908

COMPLAINANT'S EXHIBIT 19

Z-30

EXHIBIT NO. 19

NDERLIDER
ATE ENGINEER
ZMALHALCH
PUTY
LD BAILY
IEF HYDROGRAPHER

STATE OF COLORADO
ENGINEERING DEPARTMENT
DENVER

November 26, 1927.

SUBJECT Trans-Mt.Diversions,
Dist. # 3

Miss Agnes Zimmerman,
Home, Colo.

Dear Miss Zimmerman:-

Receipt of your letter of the 23rd inst. is herein acknowledged.

Your previous letter requesting information concerning the automatic charts showing the diversions by the Laramie-Poudre Tunnel for 1923,24 and 25, was immediately referred to our Mr. Baily for reply, and upon inquiry I find that this had not been attended to.

Your attention in this regard is invited to our letter addressed to you under date of December 11, 1926, which enumerates the automatic register charts filed in this office up to that time,showing the foreign diversions into the Poudre River.

As stated in that letter,the automatic charts showing diversions through the Laramie-Poudre Tunnel prior to 1926, were destroyed, according to information furnished by the Water Commissioner of District No. 3.

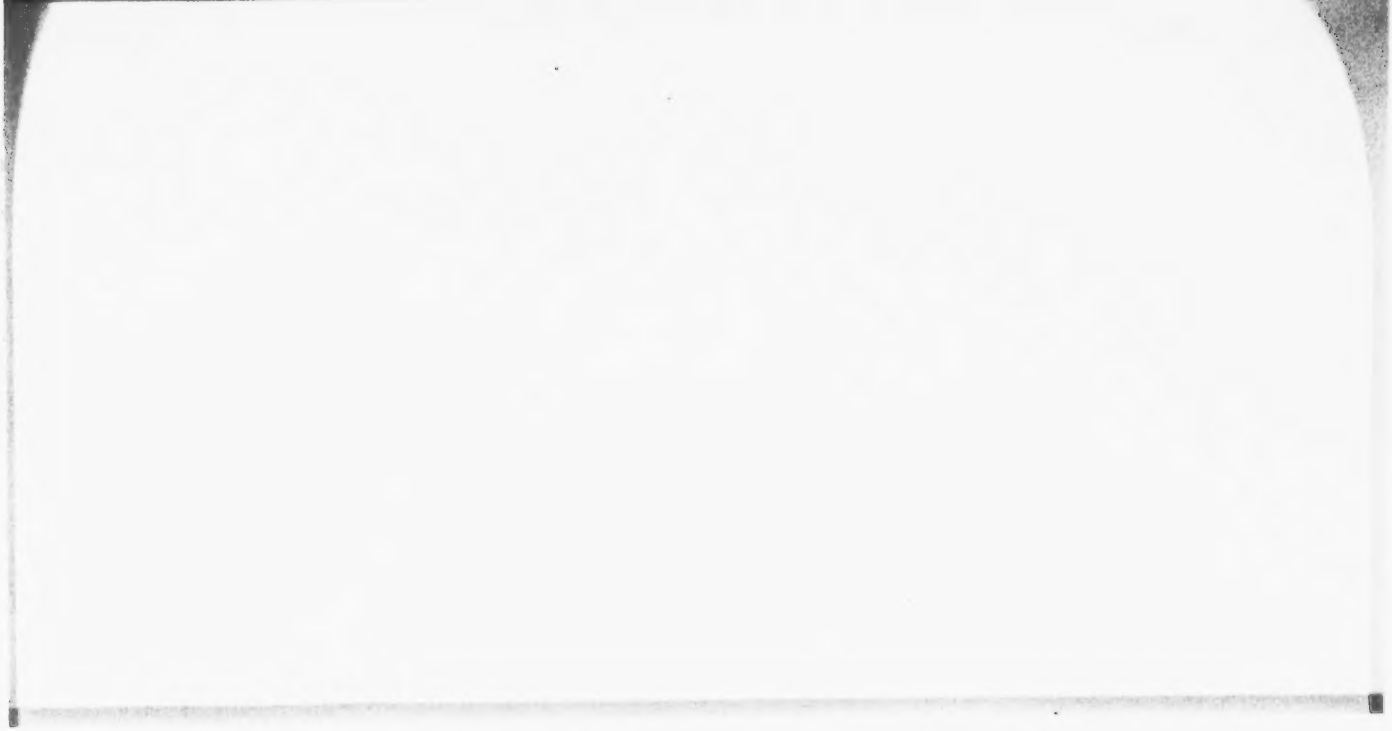
Very truly yours,

M C Hinderlider

State Engineer.

MCH/bc

1362



[fol. 1383] COMPLAINANT'S EXHIBIT No. 20

February 27, 1928.

Mr. Robert Follansbee, District Engineer, U. S. G. S., 403 New Post Office Bldg., Denver, Colorado.

DEAR MR. FOLLANSBEE:

After Mr. Hinderlider returns from Washington, please arrange a conference for some forenoon, about 11:00 and I will come down to Denver and in company with yourself, we will talk to Mr. Hinderlider about the measurements of the Trans-mountain diversions between the Laramie and Poudre Rivers.

Am anxious to have this investigation at as early a date as possible.

Very truly yours, John A. Whiting, State Engineer.

JAW:BJ

[fol. 1384] COMPLAINANT'S EXHIBIT No. 21

[Stamp:] Received Feb. 29, 1928. State Engineer.

Department of the Interior,
United States Geological Survey,
Water Resources Branch,

403 Post Office Building, Denver, Colorado

February 28, 1928.

Mr. John A. Whiting, State Engineer, Cheyenne, Wyo.

DEAR MR. WHITING:

In reply to your letter of February 27:

Mr. Hinderlider is still in Washington and is not expected back for at least another week. As soon as he returns I shall arrange a conference for you and will notify you of the date.

One meter has been returned by the Washington Office, and the equipment ordered from Gurley is also here so that one complete outfit can be sent you on short notice.

Very truly yours, Robert Follansbee, District Engineer.

[fol. 1385] COMPLAINANT'S EXHIBIT No. 22

(Copy)

March 8th, 1928.

Hon. M. C. Hinderlider, State Engineer of Colorado, Denver, Colorado.

DEAR MR. HINDERLIDER:

Wyoming has long recognized the importance and necessity of a complete inventory of the water resources of the Laramie River. The necessity of this inventory has been forcefully brought to Wyoming's attention within the past month by adverse findings in reports, as to available water supply, for lands enumerated as irrigable in Wyoming water permits of relatively early priority. The adverse findings in said reports have been based upon the large quantity of water alleged as being diverted from the Laramie River Watershed into the Cache La Poudre River Watershed in Colorado, by diversions permissible under the terms of the Modified Final Decree, by the Supreme Court of the United States, dated October 9th, 1922, in the case entitled, The State of Wyoming, Complainant, vs. The State of Colorado, The Greeley Poudre Irrigation District, and The Laramie-Poudre Reservoirs and Irrigation Company.

The Wyoming State Engineer's office, in cooperation with the United States Geological Survey, has operated over a long period of years, gaging stations at several places on the Laramie River within the boundaries of Wyoming. In order to complete the data of the water resource inventory, measurements to determine the quantity of water diverted from the Laramie River Watershed by the Laramie-Poudre trans-mountain diversions, are necessary.

In view of the allegations made in the above mentioned reports, the Wyoming State Engineer's office desires permission in friendly cooperation with yourself, as State Engineer of Colorado, and the United States Geological Survey, without expense to yourself or the State of Colorado, to inventory the quantity of water diverted from the Laramie River Watershed to the Cache La Poudre River Watershed, by trans-mountain diversions, and to jointly ascertain the legal quantity of water to which each trans-mountain

diversion and appropriation is entitled. It is mutually understood that the data, thus jointly obtained, shall be prepared in triplicate, and a copy to be filed with each of the three parties jointly participating in the water inventory.

Wyoming would appreciate your earnest consideration and prompt reply before a possible early run-off occurs.

Very truly yours, John A. Whiting, State Engineer.

JAW:GEE

C. C. to Hon. Frank C. Emerson, Governor of Wyoming; Hon. W. O. Wilson, Attorney General of Wyo.

(Here follows photolithograph of Complainant's Exhibit 23, side folio 1386.)

COMPLAINANT'S EXHIBIT 23

HINDERLIDER
STATE ENGINEER
HEMPHILL
DEPUTY
WOLD DAILY
CHIEF HYDROGRAPHER

STATE OF COLORADO
ENGINEERING DEPARTMENT
DENVER

March 26, 1928

SUBJECT

Mr. John A. Whiting, State Engineer,
Cheyenne, Wyoming.

Dear Sir:-

I have deferred replying further to your request concerning a cooperative investigation of Laramie River diversions, pending receipt of replies to letters addressed to the owners of those ditch companies which are interested.

I now have replies from such owners, and all express a wish to discuss this matter with you prior to making final decision in this regard.

Due to the inability of representatives of some of these companies to meet before April 5th., I have tentatively set that date for all parties interested to meet in this office at 1:00 o'clock to discuss the matter with you. But before making final decision in this regard it is needful to ascertain if such date will be agreeable to you.

With kind regards, I am

Very truly yours,

M C Hinderlider

State Engineer.

MCH/bc

ANSWERED

MAR 31 1928

STATE ENGINEER

[fol. 1387] COMPLAINANT'S EXHIBIT No. 24

March 31, 1928.

Hon. M. C. Hinderlider, State Engineer, Denver, Colorado.

DEAR MR. HINDERLIDER:

This will acknowledge receipt of your letter dated March 26, 1928, subject "Laramie River Diversions," in which you kindly extend an invitation to me to meet with the representatives of the various interested ditch companies in your office at one o'clock on April 5, 1928. The purpose of the meeting, as expressed in your letter, being a desire on the part of representatives of interested ditch companies to discuss with me the matter of whether you will be permitted to cooperate, as State Engineer of Colorado, in the inventory of the quantity of water diverted from the Laramie River watershed to the Cache La Poudre watershed by trans-mountain diversions, and to jointly ascertain the legal quantity of water to which each trans-mountain diversion and appropriation is entitled.

Briefly my letter dated March 8, 1928, proposed an unofficial commission of yourself, Mr. Follansbee and the writer, under whose direction, and at the expense of Wyoming, the desired inventory would be carried out. In this my thoughts were that you would represent Colorado Laramie-Poudre water users, the writer the Wyoming water users, and Mr. Follansbee, District Engineer of the United States Geological Survey, Denver, Colorado, would perform the function as a third disinterested party.

My proposal was prompted by the desire to have an efficient and harmonious commission of three men, each of whom would confer from time to time with his constituents and represent them both in the field and in conference. For the purpose of economizing in time, I believe the proposed commission should function similar to the Interstate Streams Commissioners on the tri-state compact. Hon. Delph Carpenter, Interstate Streams Commissioner for Colorado, conducts all conferences with his home people. The writer, for Wyoming, does likewise with his people. Whenever reasons require, the Commissioners meet and try to reconcile and harmonize their constituents' ideas, thus economizing on the time of everyone.

It seems to me that the meeting on April 5th, in your office, is more in the nature of a local conference for the purpose of giving the representatives of the interested ditch companies, in order that they may arrive at a decision, an opportunity to discuss with you, as their representative, the proposal set forth in my letter to you of March 8, 1928. This conference will afford you the opportunity to ascertain their [fol. 1388] wishes and convey same to me.

The fact that the trans-mountain diversions are few in number, the water rights of which, I assume, have been clearly defined by the courts; and that the work of the commission will neither destroy the ditches or appurtenant structures nor obstruct the flow of water therein leads this office to believe that there will be no objections on the part of the Colorado appropriators to the organization of the commission as outlined, or to the carrying on of the inventory.

Permit me to express to you at this time my appreciation of your many gracious favors and the hope that you will, even though I am absent, call together in your office on April 5, 1928, the owners or representatives of the various interested ditch companies and conduct the conference as planned. The State Engineer's Office awaits your reply which we hope will be favorable.

Very truly yours, John A. Whiting, State Engineer.

JAW-MHG.

(Here follows photolithograph of Complainant's Exhibit 25, side folio 1389.)

COMPLAINANT'S EXHIBIT 25

KINDERLICER
STATE ENGINEER
KERALHALCH
DEPUTY
HOLD BAILY
CHIEF HYDROGRAPHER

STATE OF COLORADO
ENGINEERING DEPARTMENT
DENVER

April 2nd, 1928

SUBJECT Laramie
EXHIBIT NO. 25

Mr. John A. Whiting, State Engineer,
Cheyenne, Wyoming.

Dear Mr. Whiting:-

Replying to your letter of March 31st., I fear that I have not heretofor made myself clear in this matter.

The request presented to this office by the Colorado water users, was for the purpose of meeting with you and through such conference to more definitely ascertain your position in this regard, especially with respect to the method for carrying out the proposed investigation.

It is my understanding that the Colorado water users are not adverse to such an investigation, provided the method of carrying out the same eliminates any chance of duplicate observations and conclusions.

In view of the fact that it will be needful to enter upon private property to make such investigations, it will be necessary to secure the cooperation of such ditch interests, and I therefore believe such conference between you and these ditch interests needful, prior to arranging for this investigation.

I will accordingly await your further reply in this regard, hoping that you may find it convenient to come to Denver next Thursday for such conference. Unfortunately it will be necessary for me to be out of my office on Friday and Saturday and the forepart of the succeeding week.

Very truly yours,

M. C. Hinderlider

State Engineer.

MCH:bc

[fol. 1390] COMP. EXH. No. 26

April 3rd, 1928.

Mr. M. C. Hinderlider, State Engineer of Colorado, Denver, Colorado.

DEAR MR. HINDERLIDER:

Many thanks for the information contained in your letter of April 2nd, 1928, subject: "Laramie River Diversions."

In that letter you indicated that the conference is desired by the representatives of the various interested ditch companies on April 5th, 1928, to ascertain as stated in your letter:

"The request presented to this office by the Colorado water users, was for the purpose of meeting with you and through such conference to more definitely ascertain your position in this regard, especially with respect to the method for carrying out the proposed investigation."

In reply to this inquiry would say that I have not given the matter particular consideration, neither have I consulted with Mr. Follansbee, of Denver, and yourself, both proposed members of the Commission, as to the method of carrying out the proposed investigations. It had been considered by me as merely a detail to be determined by the Commission, if and when, Colorado had agreed to the water inventory under the terms proposed by this office. Personally, as one of the three Commissioners, it is my thought that the work of the Commission should be conducted independently and apart from any similar work carried on by other parties. It occurs to me that Mr. Follansbee, on behalf of and in cooperation with the Commission might install an automatic gage at a suitable place on each canal. Mr. Follansbee or a hydrographer under his supervision would establish and rate each station. Mr. Follansbee would likewise receive all rating records and gage charts and from same prepare two copies, one of which to be given you, the other to be forwarded to the office of the Wyoming State Engineer.

As to "duplicate observations and conclusions", I am sure that your people will dismiss this thought when you call their attention to the fact that two of the three Commissioners are long residents of Denver, Colorado, and are ably qualified by education and experience to safeguard their interest.

I have this day written to Mr. Follansbee, kindly request-

ing [illegible]ttend your conference on April 5th and explain to th. various representatives of the interested ditch companies present the methods he would presumably use in conducting a water inventory of the trans-mountain diversions.

[fol. 1391] With kindest regards, I am,

Very truly yours, John A. Whiting, State Engineer.

JAW:GEE.

[fol. 1392] COMP. EXH. No. 27

April 3, 1928.

Hon. Robert Follansbee, District Engineer, U. S. G. S., 403 New Post Office Bldg., Denver, Colorado.

DEAR MR. FOLLANSBEE:

Mr. M. C. Hinderliter, State Engineer of Colorado, has called a conference of the owners or representatives of the owners of the various interested ditches on the Cache La Poudre River, to meet in his office at the Colorado State Capitol on April 5th, 1928 at one o'clock P. M. Mr. Hinderliter has especially invited me to be present, stating that the various representatives desire to discuss with me the method of precedure and the possibility of "duplication of observations and conclusions."

As you well know, this is our busiest time of the year and I find it impossible to keep up my office work and the field work in Wyoming in connection with the duties of my office. My personal desire would be to attend this conference in Denver but for reasons above mentioned, I find it impossible to make the trip and at the same time I feel that the importance of my being present is greatly exaggerated. The matter of inventorying the flow of water in three or four canals is not in itself of major importance but is merely one of the instances occuring in both Mr. Hinderliter's and my offices. I would therefore respectfully request that yourself and Mr. Hinderliter, being two of the three members of the proposed commission, conduct the hearing in Denver on April 5th, as planned.

Trusting that this will be entirely satisfactory, I am,

Very truly yours, John A. Whiting, State Engineer.

JAW:BJ

C. C.—Hon. M. C. Hinderliter, State Engineer, Colo., Denver, Colo.

(Here follows photolithograph of Comp. Exhibit 28, side folio 1393)

COMPLAINT'S EXHIBIT 28

M. C. HINDERLIDER
STATE ENGINEER
E. HEZMALHALCH
DEPUTY
HAROLD BAILY
CHIEF HYDROGRAPHER

STATE OF COLORADO
ENGINEERING DEPARTMENT
DENVER

May 2, 1929

SUBJECT:

EXHIBIT NO. 28
U.S. WASHINGTON, D.C.

Mr.John A.Whiting, State Engineer,
Cheyenne, Wyoming.

Dear Mr. Whiting:-

Following request by Mr. Meeker for certain hydrographic data relating to diversions from the Laramie River by Colorado ditches, the writer was called out of Denver for several days, which accounts for not having addressed you in this regard.

We would like to have a conference with you at your early convenience,for the purpose of discussing the matter of such diversions.

If you cannot find it convenient to come to Denver, I can arrange, upon short notice from you, to meet you in Cheyenne.

May we hear from you with regard to this matter,at an early date.

Very truly yours,

M C Hinderlider
State Engineer.

MCH/bc

[fol. 1394] COMP. EXH. No. 29

Laramie River Conference, Cheyenne, May 20, 1929

Colorado and Wyoming Officials

Wyoming Requests:

1. Wyoming requests strict observance of the terms of the United States Supreme Court Decree of June-October, 1922, concerning the waters of the Laramie River, with limitations of trans-mountain diversions as therein ordered, viz:

(a) Skyline ditch to 18,000 acre feet per year.

(b) Laramie Poudre Tunnel to 15,500 acre feet per year.

(c) Deadman Feeder of Wilson Supply Ditch to the relatively small amount of water diverted from Deadman Creek.

2. Cessation of diversions from the Laramie River Basin by the Columbine, Bob Creek, and Laramie-Twin and Lost Lake ditches, which are not decreed intra- or inter-state.

3. Colorado State Engineer to mail weekly to Wyoming State Engineer, copies of weekly Water Commissioners' reports of trans-mountain diversions from the Laramie River to the Poudre River Basin. (Water Commissioner District 3 to Division Engineer.)

4. Opportunity by Wyoming State Engineer to examine from time to time automatic gage charts, meter measurements and related records of Colorado trans-mountain diversions from the Laramie River to the Poudre Basin. Check meter measurements of such diversions by Wyoming to be supplied the Colorado State Engineer.

5. Installation of rating flume and automatic gage on Deadman Feeder of Wilson Supply Ditch.

(Here follow photolithographs of Comp. Exhibits 30 and 31, side folios 1395, 1396 and 1397)

COMPLAINANT'S EXHIBIT 30

HINDERLIDER
STATE ENGINEER
HEMALMALCH
DEPUTY
HAROLD BAILY
CHIEF HYDROGRAPHER

1.

STATE OF COLORADO
ENGINEERING DEPARTMENT
DENVER

April 5, 1928

Hon. John A. Whiting,
State Engineer,
Cheyenne, Wyoming.

SUBJECT Laramie River Diversions

EXHIBIT NO. 30

Dear Mr. Whiting:-

We acknowledge receipt of your letter of April 3rd in reply to our letter of April 2nd concerning the above matter.

I regret exceedingly that you found it impossible to be here today to meet with representatives of the various Colorado ditches making diversions from the Laramie River. All ditches were represented and Mr. Follansbee was present at the meeting and entered into the discussions.

After full consideration of your requests concerning a cooperative investigation of these trans-mountain diversions, the feeling prevailed that it would be entirely agreeable to our Colorado people to have your office investigate the present measuring devices installed in the ditches in question, and to make any measurements of the flow therein, and have access to all automatic register charts at all reasonable times, and to also have access to a copy of the tabular statements of the quantities of water diverted, as determined from the measurements through such devices.

They of course are agreeable to placing in proper operating condition, any measuring device which may be found by this office to be necessary to the end that reliable records may be obtained.

They are opposed, however, to turning over to any unofficial agency, the right to make final determination of the quantities of water diverted

#2. J.A.Whiting

4/5/28

by their ditches, feeling that such plan would illegally relieve the State Engineer of obligations with which he is charged by law.

As a result of the rather full discussion at the meeting just adjourned, it appeared necessary to arrange for further conference between the representatives of the ditches in question, yourself and the writer, for further consideration of this matter.

I therefore trust that you may find it convenient to designate a time when you may meet with our people, when more extended consideration may be given the matter in question.

Very truly yours,

M C Hinderlider
State Engineer.

MCH/bc

COMPLAINANT'S EXHIBIT 31

M. C. HINDERLIDER
STATE ENGINEER
C. C. HEZMALHALCH
DEPUTY
HAROLD BAILY
CHIEF HYDROGRAPHER

STATE OF COLORADO
ENGINEERING DEPARTMENT
DENVER

March 12, 1928.

SUBJECT

EXHIBIT NO. 31

Hon. John A. Whiting,
State Engineer of Wyoming,
Cheyenne, Wyoming.

Dear Mr. Whiting:-

Immediately after our conference last week, I addressed letters to the owners of the principal trans-mountain diversions from the Laramie to the Poudre Rivers, reciting the nature and reason for your request for a cooperative investigation of such trans-mountain diversions, requesting that I be informed of their views in this regard, and incidentally advising them that I saw no particular objection to the granting of your request and that if such investigation were made it would be well to have it of a cooperative nature.

Immediately upon reply to my letters I will advise you promptly of their reaction and the final decision of this office in this regard.

With kind personal regards, I am

Very truly yours,

M. C. Hinderlider

State Engineer.

MCH/bc

[fol. 1398] COMP. EXHIBIT No. 32

June 21st, 1930.

The Honorable William H. Adams, Governor of Colorado, Denver, Colorado.
Honorable M. C. Hinderlider, State Engineer of Colorado, Denver, Colorado.
Honorable Robert E. Winbourn, Attorney General of Colorado, Denver, Colorado.
Honorable Delph E. Carpenter, Commissioner for Colorado, Greeley, Colorado.

GENTLEMEN:

I

The Supreme Court of the United States in determining the relative rights of the States of Wyoming and Colorado to appropriate and apply to beneficial use the water of the Laramie River and its tributaries, after reviewing the evidence submitted in the case as presented, and having considered the findings of the Commissioners to whom the matter was referred, found: (260 U. S., page 1).

1. That the State of Colorado had an established right to divert by means of the Skyline Ditch from the Laramie River and its tributaries, eighteen thousand (18,000) acre feet of water per annum.

2. That rights recognized by the State of Colorado authorizing the diversion and use from the Laramie River and its tributaries, of four thousand two hundred and fifty (4,250) acre feet of water per annum, for the irrigation of that number of acres of native hay meadows in the Laramie [fol. 1399] Valley in Colorado, referred to as the meadow land appropriations, should not be prejudiced.

3. That after recognizing the above appropriations aggregating twenty-two thousand two hundred and fifty (22,250) acre feet of water per annum, there was remaining available water in said stream and its tributaries subject to appropriation and use in the amount of two hundred eighty-eight thousand (288,000) acre feet annually; that of this amount two hundred seventy-two thousand five hundred (272,500) acre feet per annum was required to satisfy senior appropriations in Wyoming, leaving available for diversion annually for the so-called Laramie-Poudre Tun-

nel appropriation the amount of fifteen thousand five hundred (15,500) acre feet of water, and on these findings entered its decree dated June 5th, 1922, and which as subsequently modified and entered October 9th, 1922, was in substance as follows:

a. That the State of Colorado and the defendant corporations, their officers, agents and servants were enjoined from diverting or taking from the Laramie River and its tributaries in the State of Colorado more than fifteen thousand five hundred (15,500) acre feet of water per annum in virtue of or through the Laramie-Poudre Tunnel appropriation in the State of Colorado;

b. That the right of the State of Colorado or any one then recognized by her as duly entitled thereto to divert and take from said stream and its tributaries within the State of Colorado eighteen thousand (18,000) acre feet of water per annum through the Skyline Ditch should not be prejudiced;

c. That the right of the State of Colorado or any one then recognized by her as duly entitled thereto to continue [fol. 1400] to exercise the right then existing and recognized, to divert and take from the Laramie River and its tributaries in the State of Colorado four thousand two hundred and fifty (4,250) acre feet of water per annum through the meadow land appropriations, should not be prejudiced;

d. That the right of the State of Colorado or of any one then recognized as duly entitled thereto, to continue to exercise the right then existing, and recognized in said Decree, to divert and take from the head-waters of Deadman Creek, a Colorado tributary of the Laramie River, the relatively small amount of water appropriated therefrom prior to the year 1902, by and through what is designated as the Wilson Supply Ditch, should not be prejudiced;

e. That the right of the State of Colorado or the State of Wyoming or of any one then recognized by either State as duly entitled thereto, to continue to exercise the right to divert and use water from Sand Creek, in virtue of any then existing and lawful appropriation of waters of such creek, should not be prejudiced.

II

Examinations of the water shed of the Laramie River and its tributaries show that new diversion ditches have been constructed and that ditches existing at the time of the submission of the above case to the United States Supreme Court, have been reconstructed and/or enlarged, and that such new and/or enlarged and reconstructed ditches have been and are being used in furtherance of excessive and unlawful diversions of water from the Laramie River and/or its tributaries.

[fol. 1401]

III

Such examinations of the water shed of the Laramie River and its tributaries further show that new reservoirs have been constructed, and that reservoirs, existing at the time of the submission of the above case to the United States Supreme Court, have been enlarged, and that such new and/or enlarged reservoirs have been and are being used in furtherance of such excessive and unlawful diversions of water from the Laramie River and/or its tributaries.

IV

The official records of the State of Colorado for the year 1929 and prior years show that diversions of water from the Laramie River and/or its tributaries for use in the State of Colorado by users of water in Colorado have not been confined to the limitations set forth in said Decree.

V

The State of Wyoming hereby respectfully calls your attention to the said excessive and unlawful diversions of water, including among others the following diversions: Link Ditch, Skyline Ditch, Laramie-Poudre Tunnel (including collection ditches), Bob Creek Ditch, Columbine Ditch, Wilson Supply Ditch, the Sand Creek Ditch and also the waters diverted and stored in Chambers Lake, Lost Lake, Laramie Lake, Twin Lake, Lily Lake and other reservoirs, all the waters of which so excessively and unlawfully diverted, are discharged into the Poudre River in violation of the terms of said Decree.

VI

The usual shortage of water from the water shed of the Laramie River and its tributaries during the present irrigating season, requires that excessive and illegal diversions of water as above referred to, be brought to the attention [fol. 1402] of the officials of the State of Colorado that said State may prohibit said excessive and illegal diversions of water.

VII

Said continued excessive and illegal diversion of water by and within the State of Colorado, results in depriving the lawful appropriators by and within the State of Wyoming of the use of the waters to which they are entitled, under the terms of said Decree.

Wherefore, the State of Wyoming respectfully requests that the diversions of water from the Laramie River and/or its tributaries by and within the State of Colorado be confined to the limitations as established by said Decree; that such excessive diversions be immediately discontinued; and all illegal diversions be prohibited; to enable the State of Wyoming to obtain and use the full amount of water per annum as allotted to her under the terms of said Decree.

In testimony whereof we have hereunto set our hands at Cheyenne, Wyoming, this twenty-first day of June, A. D. 1930.

—— ——, Governor of Wyoming; —— ——, State Engineer of Wyoming and Interstate Streams Commissioner; —— ——, Attorney General of Wyoming.

(Here follow photolithographs of Comp. Exhibit 33, side folios 1403, 1404 and 1405)

COMPLAINANT'S EXHIBIT 33

ROBERT E WINBOURN
ATTORNEY GENERAL
CHARLES ROACH
DEPUTY ATTORNEY GENERAL

OFFICES OF

THE ATTORNEY GENERAL OF COLORADO

DENVER

ASSISTANT
ATTORNEYS GENERAL
SIDNEY P GOODMAN
FRED A HARRISON
ARTHUR L OLSON
GEO A CROWDER
A L BEARDSLEY
EDW J PLUNKETT
COLIN A SMITH
OLIVER DEAN
TOM L POLLOCK

August 14, 1930.

EXHIBIT NO. 33

E. O. WHITTINGTON

The Hon. Frank C. Emerson
Governor of Wyoming
Cheyenne, Wyoming

Hon. John A. Whiting
State Engineer of Wyoming and
Interstate Streams Commissioner
Cheyenne, Wyoming

Hon. William O. Wilson
Attorney General of Wyoming
Cheyenne, Wyoming

RECEIVED AUG 15 1930 GOVERNOR'S OFFICE

Gentlemen:

The attached letter in response to your letter of June 21, 1930, was signed by Attorney General Robert E. Winbourn who departed this life on the 7th inst., and before the letter was ready for transmittal to you. I approve the letter, however, as his successor in office.

Permit me to add that the delay in answering your favor of June 21 was occasioned, in large part, by the recent illness and death of Mr. Winbourn.

Respectfully yours,

JOHN S. UNDERWOOD,
Attorney General,

by Charles Roach
CHARLES ROACH,
Deputy Attorney General.

CR:L

ERT E WINBOURN
TORNEY GENERAL
CHARLES ROACH
T ATTORNEY GENERAL

OFFICES OF

THE ATTORNEY GENERAL OF COLORADO

DENVER

ASSISTANTS
ATTORNEYS GENERAL
SIDNEY P GOODSMAN
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ARTHUR L OLSON
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A L BEARDSLEY
EDW J PLUNKETT
COLIN A SMITH
OLIVER DEAN
TOM L POLLOCK

July 28, 1930.

The Hon. Frank C. Emerson
Governor of Wyoming
Cheyenne, Wyoming

Hon. John A. Whiting
State Engineer of Wyoming and
Interstate Streams Commissioner
Cheyenne, Wyoming

Hon. William O. Wilson
Attorney General of Wyoming
Cheyenne, Wyoming

Gentlemen:

We beg to reply further to your letter of June 21, 1930, which contains a synopsis of the decree of the Supreme Court of the United States in the case of State of Wyoming v. State of Colorado, et al., reported in 260 U. S. Rep. 1, alleging that diversions of water from the Laramie River in Colorado have been made by certain named ditches in violation of the terms of that decree and requesting a discontinuance of all illegal diversions.

We have considered carefully the complaints made by you and have checked all Colorado records of diversions of water out of the Laramie River in the State of Colorado and have been unable to find that Colorado or her citizens have violated the decree by diversions through the tunnel in excess of the amount

allowed, or by aggregate annual diversions by Colorado users in excess of the total amount mentioned in the decree).

Please be assured that we at all times are willing and anxious to abide by the terms of said decree in every particular, and if there has been any violation it has been wholly unintentional on the part of Colorado officials. If there are records of illegal diversions of water from the Laramie River in Colorado which have not been brought to our attention and you care to submit them to us, we shall be pleased to check them over in detail and, if found to be a violation of the decree, we will gladly cause a discontinuance of the same; or if you care to confer personally with us and point out wherein the decree has been violated, it will give us pleasure to join you in such a conference.

It is our earnest desire to work in harmony with the people of Wyoming to the end that any and all matters of difference along the lines suggested may be adjusted to our mutual satisfaction.

Respectfully yours,

Governor of Colorado

State Engineer of Colorado

Attorney General of Colorado

Commissioner for Colorado.

[fol. 1495] COMP. EXH. No. 34

EXHIBIT No. 34

Runoff Table A

Annual recorded flow of Laramie River at Jelm, Wyoming, acre feet, from records of United States Geological Survey and Biennial Reports of the State Engineer of Wyoming, with monthly extensions where records are incomplete

By Elmer K. Nelson, Civil Engineer, Laramie, Wyoming, Apr., 1933

Year	Period year	Mean runoff at year	Runoff A. F.	Runoff index mean 143,700	Mean index at year	Percent variation from mean. accumulative
1911	1	.....	124,900	87.0	87.0	− 13.0
1912	2	.....	189,700	131.8	109.4	+ 18.8
1913	3	.....	101,100	70.4	96.4	− 10.8
1914	4	.....	185,200	129.0	104.5	+ 18.2
1915	5	.....	85,200	59.3	95.5	− 22.5
1916	6	.....	129,100	89.9	94.6	− 32.6
1917	7	.....	238,900	166.2	104.8	+ 33.6
1918	8	.....	150,000	104.3	104.7	+ 37.9
1919	9	.....	76,200	53.0	99.0	− 9.1
1920	10	.....	166,100	115.6	106.5	+ 6.5
1921	11	.....	172,300	120.0	102.3	+ 26.5
1922	12	.....	82,900	57.6	98.8	− 15.9
1923	13	.....	176,300	122.7	100.3	+ 6.8
1924	14	143,700	134,000	93.2	100.0	0.0
1925	15	.....	89,680	62.4	97.5	− 37.6
1926	16	.....	156,460	108.8	104.3	− 28.8
1927	17	.....	116,220	80.8	97.2	− 48.0
1928	18	.....	154,270	107.2	97.8	− 40.8
1929	19	.....	157,390	109.5	98.3	− 31.3
1930	20	.....	99,200	69.0	96.9	− 62.3
1931	21	.....	74,890	52.0	94.8	−110.3
1932	22	135,560	122,310	85.3	94.3	−125.0
Total	22		2,982,320			

Mean Annual runoff of period 1911–24 143,700 A. F.
Mean Annual runoff of period 1911–32 135,560 A. F.
Mean Annual runoff of period 1923–32 128,070 A. F.

[fol. 1407] COMP. EXH. No. 35

Runoff Table B

Annual recorded flow of Laramie River at Woods, Wyoming, in acre feet, from records of United States Geological Survey and Biennial reports of State Engineer of Wyoming, with extensions, monthly and annual, where records are incomplete

By Elmer K. Nelson, Civil Engineer, Laramie, Wyoming, April, 1933

Year	Period year	Mean runoff at year	Runoff A. F.	Runoff index mean 143,700	Mean index at year	Percent variation from mean accumulative
1911	1	.....	148,500	88.4	.....	− 11.6
1912	2	.....	210,800	125.4	.....	+ 13.8
1913	3	.....	108,600	64.6	.....	− 21.6
1914	4	.....	189,300	112.60	.....	− 9.0
1915	5	.....	92,200	54.8	.....	− 54.2
1916	6	.....	153,200	91.3	.....	− 62.9
1917	7	.....	277,200	164.8	.....	+ 1.9
1918	8	.....	185,700	110.4	.....	+ 12.3
1919	9	.....	81,000	48.2	.....	− 39.5
1920	10	.....	221,900	132.0	.....	− 7.5
1921	11	.....	205,200	122.1	.....	+ 14.6
1922	12	.....	108,000	64.4	.....	− 21.0
1923	13	.....	203,300	121.0	.....	0.0
1924	14	168,000	168,000	100.0	100.0	0.0
1925	15	.....	102,500	61.0	.....	− 39.0
1926	16	.....	181,400	108.0	.....	− 31.0
1927	17	.....	137,800	82.0	.....	− 49.0
1928	18	.....	181,400	108.0	.....	− 41.0
1929	19	.....	181,400	108.0	.....	− 33.0
1930	20	.....	114,200	68.0	.....	− 65.0
1931	21	.....	84,000	50.0	.....	−115.0
1932	22	158,240	145,600	86.6	94.2	−128.4
Total yrs...	22		3,481,200			

Mean annual Runoff of period 1911-24 168,000 A. F.
Mean annual Runoff of period 1911-32 158,240 A. F.
Mean annual Runoff of period 1923-32 149,960 A. F.

[fol. 1408] COMP. EXH. #36

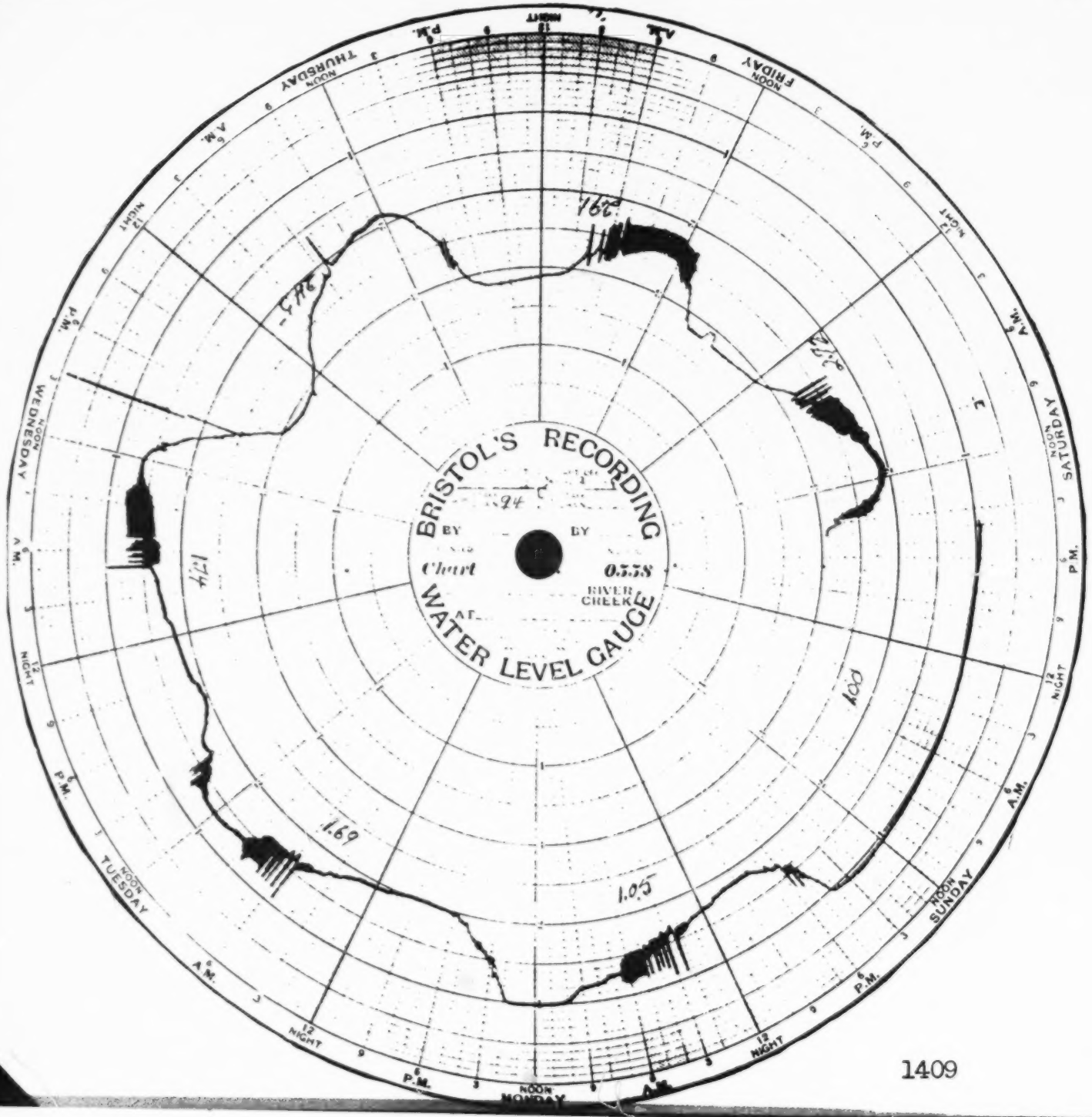
Runoff Table C

Annual recorded flow of Little Laramie River at Filmore, Wyo., in acre feet from records of United States Geological Survey and Biennial Reports of State Engineer of Wyoming, with extensions, monthly and annual, where records are incomplete

By Elmer K. Nelson, Civil Engineer, Laramie, Wyoming, Apr., 1933

Year	Period year	Mean runoff at year	Runoff A. F.	Runoff index mean 86,400	Mean index at year	Percent variation from mean. Accumulative
1911	1	.....	66,400	76.9	.....	− 23.1
1912	2	.....	119,900	139.0	.....	+ 15.9
1913	3	.....	66,000	76.5	.....	+ 7.6
1914	4	.....	93,000	107.6	.....	0.0
1915	5	.....	54,900	63.6	.....	− 36.4
1916	6	.....	62,800	72.7	.....	− 63.7
1917	7	.....	134,800	156.0	.....	− 7.6
1918	8	.....	108,000	125.0	.....	+ 17.5
1919	9	.....	44,800	52.0	.....	− 30.5
1920	10	.....	103,900	120.3	.....	− 10.2
1921	11	.....	103,800	120.2	.....	+ 10.0
1922	12	.....	65,900	76.3	.....	− 13.7
1923	13	.....	92,500	107.1	.....	− 6.6
1924	14	86,400	92,300	106.8	100.0	0.0
1925	15	.....	64,700	74.9	.....	− 25.1
1926	16	.....	92,200	106.6	.....	− 18.5
1927	17	.....	73,800	85.5	.....	− 33.0
1928	18	.....	95,000	110.0	.....	− 23.0
1929	19	.....	95,900	111.0	.....	− 12.0
1930	20	.....	62,200	72.0	.....	− 40.0
1931	21	.....	44,100	51.0	.....	− 89.0
1932	22	82,330	74,300	86.0	95.3	−103.0
Total	22		1,811,200			

Mean Annual Runoff of period 1911–1924 86,400 A. F.
Mean Annual Runoff of period 1911–1932 82,300 A. F.
Mean Annual Runoff of period 1923–1932 78,700 A. F.


BRISTOL'S RECORDING
BY
BY
Chart
0558
RIVER CREEK
AT
WATER LEVEL GAUGE
THURSDAY
FRIDAY
SATURDAY
SUNDAY
MONDAY
TUESDAY
WEDNESDAY
NOON
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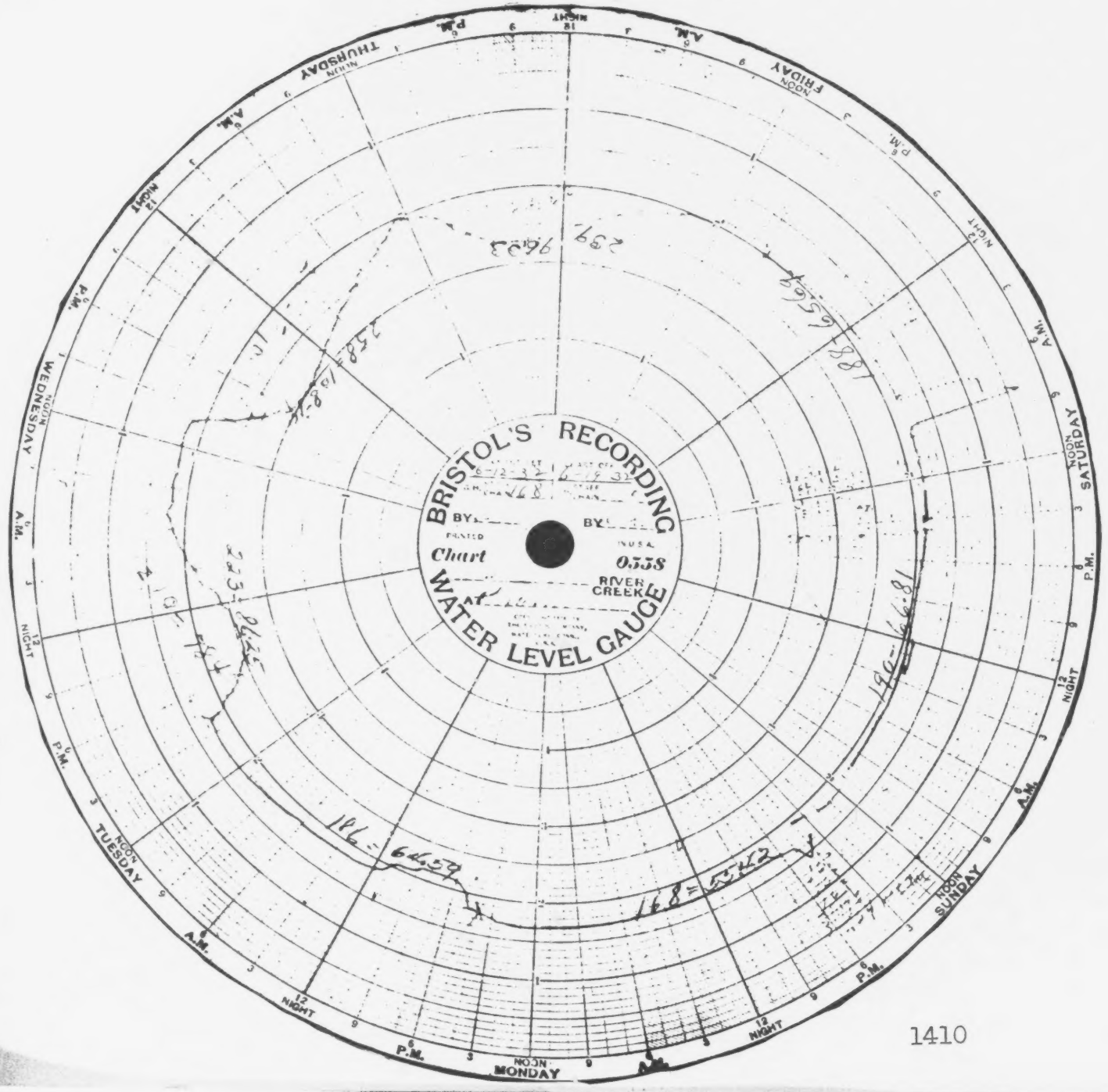
COMPLAINANT'S EXHIBIT 38



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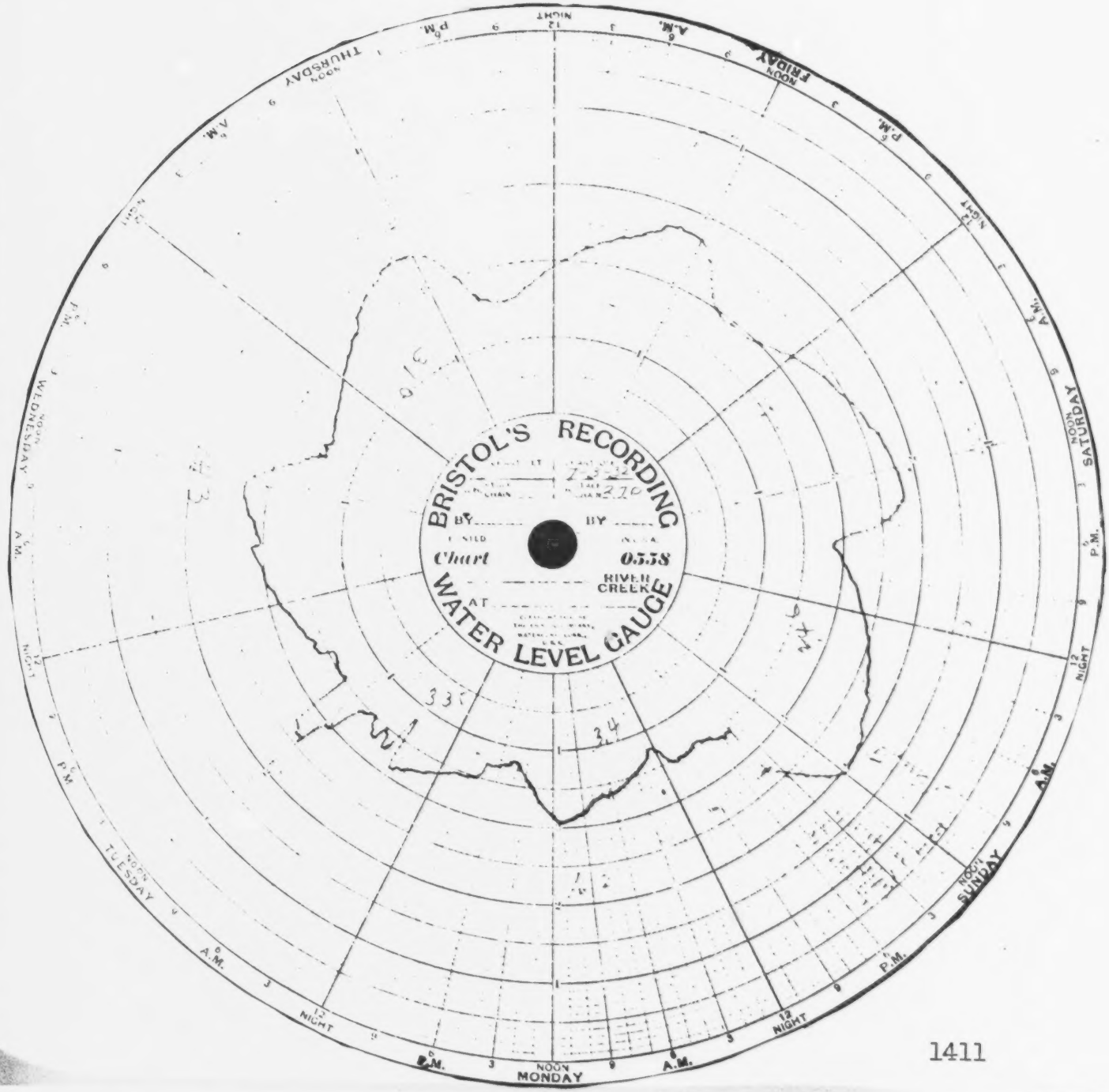
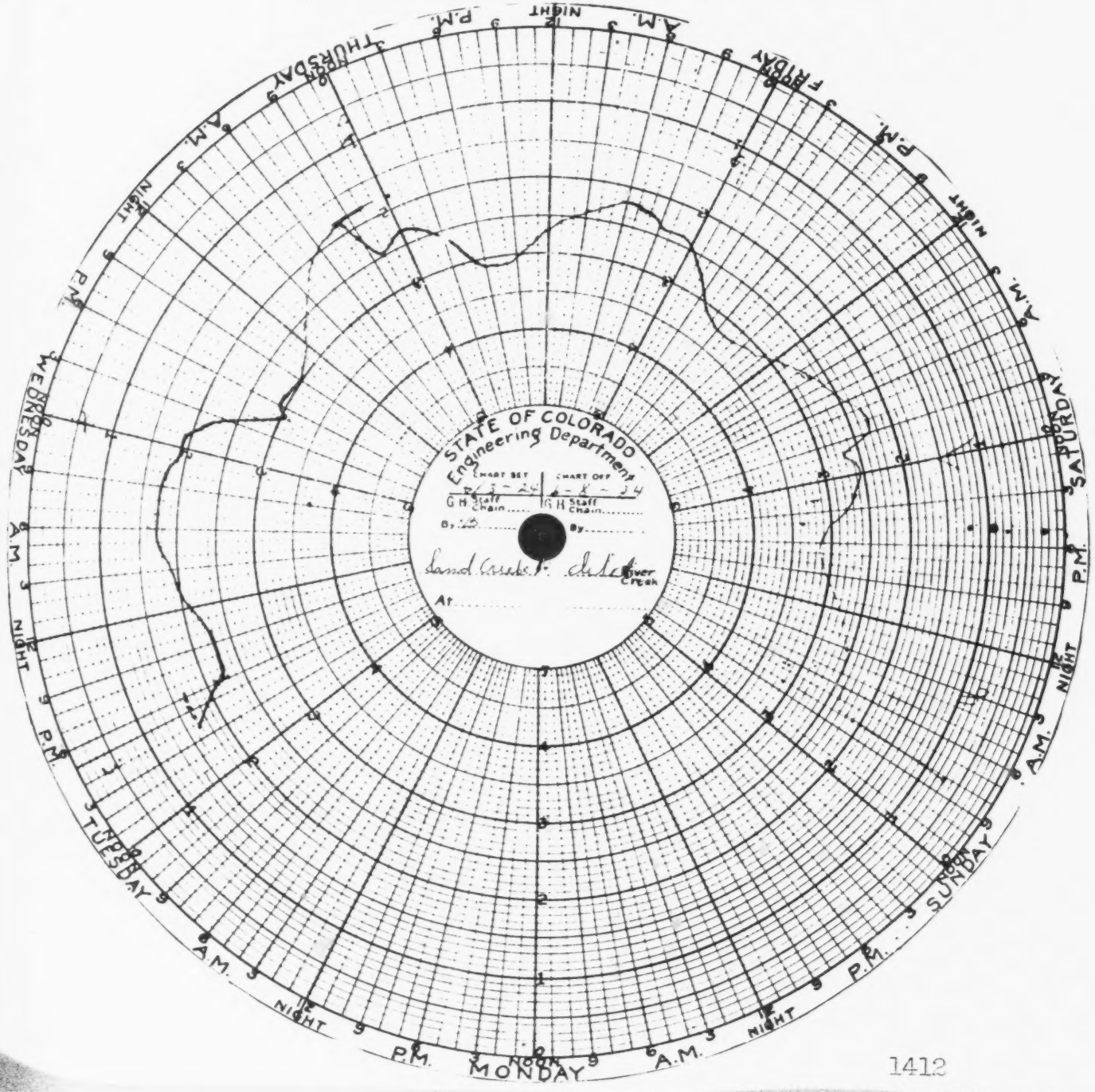


COMPLAINANT'S EXHIBIT 40



[fols. 1413-1629] COMP. EXH. #41

Skyline Ditch Diversions—June, 1926

From the Laramie River to the Poudre River

Compiled from Weekly Reports of Water Commissioner Water District #3 (Poudre River) to Division Engineer at Denver, and computed from Automatic Gage Height Charts of Skyline Ditch on file in State Engineer's Office, Denver, Colorado, Apr. 5, 1933

R. I. Meeker, Irrigation Engineer

Average Weekly Diversions in Second Feet

	As reported by Water Com'r District No. 3		As computed from automatic gage height charts by Meeker	
Week of 1926	Quantity	No. of days	Quantity	No. of days
June 6-12	136 s.f.	5	142 sec. ft.	7
June 13-19	155 s.f.	2	99 sec. ft.	7
June 20-26	111 s.f.	4	111 sec. ft.	7

Transposing the above values into acre feet gives the following table:

Average Weekly Diversions in Acre Feet

Week of 1926	As reported by Water Com'r Dist. No..3	As computed from automatic gage charts by Meeker
June 6-12	1360 acre feet	1988 acre feet
June 13-19	620 acre feet	1386 acre feet
June 20-26	888 acre feet	1127 acre feet
Totals	2868 acre feet	4501 acre feet
		2868 acre feet
Unreported water		1633 acre feet but recorded on charts.

Colorado Official rating table of Skyline Ditch applied to automatic chart gage heights by R. I. Meeker.

[fol. 1630] COMP. EXHIBIT 42

Laramie River Near Jelm, Wyo.

Location.—In sec. 15, T. 12 N., R. 77 W., at highway bridge at Boswell's ranch, a quarter of a mile below Colorado-Wyoming line, 4 miles south of Jelm, Albany County.

Drainage Area.—297 square miles (measured on topographic map).

Records Available.—May 7, 1911, to September 30, 1921. From June 22, 1904, to October 31, 1905, a station was maintained at Decker's ranch, half a mile south of the State line. The records at the two stations are practically comparable, as there are no tributaries nor diversions of any account between.

[fol. 1631] Gage.—Bristol water-stage recorder at downstream side of right bridge abutment used since 1911. Vertical staff during 1904-5.

Extremes of Discharge.—1904-5, 1911-1921: Maximum stage recorded, 4.2 feet at noon June 8, 1920, from high-water mark (discharge, 3,840 second-feet); minimum stage recorded, 1.8 feet on September 22-24, October 4-8, 18-23, 28-31, 1905 (discharge, 22 second-feet).

Diversions.—Between Glendevey and Jelm stations court decrees for diversion of 292 second-feet from Laramie River and 329 second-feet from intervening tributaries.

Cooperation.—Station maintained in cooperation with State engineer of Colorado.

Accuracy.—Gage read twice daily during 1904-5. Since 1911 gage heights obtained from continuous record. Rating curves well defined. Records good except during winter, for which they are fair.

Monthly Discharge of Laramie River Near Jelm, Wyo., for 1904-5, 1911-1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
1904				
June 22-30	733	408	560	10,000
July	635	140	272	16,700
August	156	68	101	6,210
September	68	32	45.9	2,730
The period	.....	.....	.....	35,600
1904-5				
October	49	32	44.6	2,740
November	.....	.....	40	2,380
December	.....	.....	35	2,150
January	.....	.....	30	1,840
February	.....	.....	25	1,390
March	.....	.....	22	1,350
April	112	22	50.1	2,980
May	1,128	112	458	28,200
June	1,920	435	1,160	69,000
July	455	124	212	13,000
August	160	45	97.8	6,010
September	58	22	39.6	2,360
The year	1,920	.....	184	133,000
1911				
May 7-31	833	387	629	31,200
June	1,210	300	792	47,100
July	492	106	223	137,00
August	106	43	71.4	4,390
September	74	33	43.1	2,560
The period	.....	.....	.....	99,000

Monthly Discharge of Laramie River Near Jelm, Wyo., for 1904-5, 1911-1921—Continued

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
1911–12				
October	132	56	68.1	4,180
November	94	50	62.3	3,710
December	.....	.....	45	2,770
January	.....	.....	40	2,460
February	.....	.....	45	2,590
March	.....	.....	45	2,770
April	147	.....	60	3,570
May	2,020	76	518	31,800
June	2,460	690	1,510	89,900
July	1,390	240	547	33,600
August	290	57	120	7,380
September	134	57	81.7	4,860
The year	2,460	.....	263	190,000
[fol. 1632]				
1912–13				
October	110	57	83.3	5,120
November	76	38	55.3	3,290
December	.....	.....	35	2,150
January	.....	.....	40	2,460
February	.....	.....	35	1,940
March	.....	.....	50	3,070
April	334	.....	175	10,400
May	906	250	516	31,700
June	836	212	441	26,200
July	230	90	135	8,300
August	102	35	55.3	3,400
September	77	28	52.0	3,090
The year	836	.....	140	101,000
1913–14				
October	130	50	71.4	4,390
November	67	42	55.9	3,330
December	.....	.....	45	2,770
January	.....	.....	40	2,460
February	.....	.....	40	2,220
March	.....	.....	50	3,070
April	202	.....	115	6,840
May	2,280	155	957	58,800
June	2,980	472	1,340	79,700
July	472	130	234	14,400
August	170	60	108	6,640
September	80	25	37.3	2,220
The year	2,980	.....	258	187,000
1914–15				
October	80	50	71.6	4,400
November	.....	.....	45	2,680
December	.....	.....	28	1,720
January	.....	.....	22	1,350
February	.....	.....	28	1,560
March	.....	.....	30	1,840
April	.....	.....	120	7,140
May	547	110	304	18,700
June	984	250	477	28,400
July	250	67	129	7,930

Monthly Discharge of Laramie River Near Jelm, Wyo., for 1904–5, 1911–1921—Continued

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
1914–15				
August	88	49	73.1	4,490
September	99	41	63.4	3,770
The year	984	.....	116	84,000
1915–16				
October	99	49	68.8	4,230
November	.....	.....	50	2,980
December	.....	.....	45	2,770
January	.....	.....	48	2,950
February	.....	.....	48	2,760
March	.....	.....	65	4,000
April	270	60	116	6,900
May	1,500	170	528	32,500
June	1,110	375	762	45,300
July	330	80	154	9,470
August	145	70	97.6	6,000
September	170	52	82.4	4,900
The year	1,500	.....	173	125,000
1916–17				
October	.....	.....	90	5,530
November	.....	.....	80	4,760
December	.....	.....	65	4,000
January	.....	.....	52	3,200
February	.....	.....	50	2,780
March	.....	.....	40	2,460
April	.....	.....	100	5,950
May	1,090	104	470	28,900
June	2,970	512	2,000	119,000
July	2,300	284	876	53,900
August	305	91	172	10,600
September	93	62	81.0	4,820
The year	2,970	.....	340	246,000

[fol. 1633]

1917–18				
October	62	24	44.5	2,740
November	.....	.....	40	2,380
December	.....	.....	35	2,150
January	.....	.....	35	2,150
February	.....	.....	35	1,940
March	.....	.....	45	2,770
April	.....	.....	87	5,180
May	1,280	95	581	35,700
June	1,790	335	1,170	69,600
July	510	112	242	14,900
August	140	46	90 7	5,580
September	101	46	61.0	3,630
The year	1,790	.....	206	149,000

Monthly Discharge of Laramie River Near Jelm, Wyo., for 1904-5, 1911-1921—Continued

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
1918–19				
October	.....	.....	50	3,070
November	.....	.....	45	2,680
December	.....	.....	45	2,770
January	.....	.....	45	2,770
February	.....	.....	45	2,500
March	.....	.....	50	3,070
April	.....	.....	120	7,140
May	708	185	425	26,100
June	497	147	282	16,800
July	190	50	91.8	5,640
August	114	28	54.9	3,380
September	67	26	37.8	2,250
The year	708	.....	108	78,200
1919–20				
October	50	34	42.6	2,620
November	.....	.....	35	2,080
December	.....	.....	30	1,840
January	.....	.....	30	1,840
February	.....	.....	25	1,440
March	.....	.....	30	1,840
April	.....	.....	50	2,980
May	1,520	100	590	36,300
June	2,130	796	1,390	82,700
July	756	138	284	17,500
August	395	68	148	9,100
September	114	58	75.9	4,520
The year	2,130	.....	228	165,000
1920–21				
October	75	52	59.7	3,670
November	.....	.....	30	1,790
December	.....	.....	40	2,460
January	.....	.....	40	2,460
February	.....	.....	40	2,220
March	.....	.....	50	3,070
April	.....	.....	85	5,060
May	1,600	124	584	35,900
June	2,160	602	1,410	83,900
July	542	131	314	19,300
August	242	78	123	7,560
September	111	49	62.4	3,710
The year	2,160	.....	236	171,000

Note.—Winter records estimated. Records for 1912 revised.

Laramie River At Woods Landing, Wyo.

Location.—In sec. 11, T. 13 N., R. 77W., at highway bridge at Woods Landing, a short distance below mouth of Wood Creek, nearest tributary.

Drainage Area.—Not measured.

Records Available.—July 1, 1890, to June 30, 1892; April 12, 1896, to September 30, 1900; May 7 to November 11, 1911.

Gage.—Vertical staff; no determined relation between gage used during 1911 and those used prior to 1900.

[fol. 1634] Diversions.—Practically no water is diverted between station near Jelm and Woods Landing.

Extremes of Discharge.—1890-1892; 1896-1900; 1911: Maximum stage recorded, 4.65 feet on June 25, 1899 (discharge, 4,500 second-feet); minimum stage recorded, 1.0 foot on September 23, 1911 (discharge, 17 second-feet).

Accuracy.—No statement of accuracy, as conditions under which station was maintained are not known. Records fair for 1911.

Monthly Discharge of Laramie River at Woods Landing, Wyo., for 1890-91, 1896-1900, 1911

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
1890				
July	587	181	378	23,200
August	302	107	190	11,700
September	117	69	82.6	4,920
The period	.....	.....	.....	39,800
1890-91				
October	102	67	83.6	5,140
November	.....	.....	50	2,980
December	.....	.....	45	2,770
January	.....	.....	40	2,460
February	.....	.....	40	2,220
March	.....	.....	40	2,460
April	.....	.....	100	5,950
May	1,120	397	852	52,400
June	1,500	703	1,140	67,800
July	980	297	514	31,600
August	451	134	268	16,500
September	198	82	162	9,640
The year	1,500	.....	279	202,000
1892				
April	295	74	175	10,400
May 1-26	1,260	229	440	22,700
June 8-30	1,980	1,010	1,350	61,600
1896				
April 12-30	754	69	222	8,370
May	2,170	275	618	38,000
June	1,200	165	499	29,700
July	220	62	127	7,810
August	231	49	94.8	5,830
September	190	62	116	6,900
The period	.....	.....	.....	96,600

Monthly Discharge of Laramie River at Woods Landing, Wyo., for 1890-91, 1896-1900, 1911—Continued

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
1896–97				
October	130	.....	100	6,150
November	.....	.....	50	2,980
December	.....	.....	40	2,460
January	.....	.....	35	2,150
February	.....	.....	35	1,940
March	.....	.....	40	2,460
April	350	48	128	7,620
May	3,420	443	1,960	12,100
June	2,700	550	1,560	92,800
July	475	125	266	16,400
August	183	70	92.7	5,700
September	70	60	65.3	3,890
The year	3,420	.....	217	157,000
1898				
October	.....	.....	50	3,070
November	.....	.....	40	2,380
December	.....	.....	35	2,150
January	.....	.....	35	2,150
February	.....	.....	35	1,940
March	.....	.....	45	2,770
April	350	85	129	7,680
May	1,570	125	637	39,200
June	1,400	245	969	57,700
July	200	50	89.4	5,500
August	50	40	44.2	2,720
September	40	40	40.0	2,380
The year	1,570	.....	180	130,000
[fol. 1635]				
1898–99				
October	45	.....	42	2,580
November	.....	.....	40	2,380
December	.....	.....	35	2,150
January	.....	.....	35	2,150
February	.....	.....	35	1,940
March	.....	.....	40	2,460
April	.....	.....	100	5,950
May	2,620	125	1,280	78,700
June	4,500	2,040	3,220	192,000
July	3,200	320	1,250	76,900
August	512	60	191	11,700
September	85	45	56.3	3,350
The year	4,500	.....	528	382,000
1899–1900				
October	92	45	65.0	4,000
November	.....	.....	50	2,980
December	.....	.....	45	2,770
January	.....	.....	40	2,460
February	.....	.....	40	2,220
March	.....	.....	50	3,070
April	380	50	125	7,440
May	4,000	290	1,940	11,900
June	3,780	290	1,780	106,000

Monthly Discharge of Laramie River at Woods Landing, Wyo., for 1890-91, 1896-1900, 1911—Continued

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
1899-1900				
July	290	60	111	6,820
August	70	40	50	3,070
September	55	40	44.3	2,640
The year	4,000	.....	214	155,000
1911				
May 7-31	975	335	711	36,400
June	1,480	310	943	56,100
July	410	75	242	14,900
August	180	32	77.5	4,770
September	110	17	29.6	1,760
The period	.....	.....	.....	114,000
October	220	32	75.7	4,650
November 1-11	110	24	47.3	1,030

Note.—Winter records revised.

Laramie River and Pioneer Canal Near Woods, Wyo.

Location.—In sec. 36, T. 14 N., R. 77 W., at diversion dam for Pioneer canal, 2 miles above Woods post office, in Albany County. Nearest important tributary, Fox Creek, enters 3 miles above.

Drainage Area.—409 square miles (measured on base maps of Wyoming and Colorado; scale, 1:500,000).

Records Available.—May 1, 1912, to September 30, 1921.

Gage.—Bristol water-stage recorder whose datum is the crest of the dam. Gage originally at left end of dam just below Pioneer canal headgates. On September 23, 1915, gage was moved to upper wing wall of headgates, and although it is actually above the canal intake it still indicates the amount passing the dam, as it is in the pool formed by diversion dam. Chain gage in Pioneer canal is at Johnson Bridge, 1½ miles below intake. It is read by an employee of the Laramie Water Co.

Extremes of Discharge.—1912-1921: Maximum stage recorded, 4.4 feet from 8 a. m. to noon June 23, 1917 (river discharge, 3,310 second-feet, combined discharge, 3,820 second-feet); minimum flow probably occurs during winter

[fol. 1636] Diversions.—By decree of district court dated December 27, 1912, there were adjudicated diversions of approximately 10 second-feet from Laramie River be-

tween the State line and Pioneer dam, exclusive of the Pioneer canal, which has decrees for 282 second-feet. Enlargement of Pioneer canal has storage rights for 68,500 acre-feet in Lake Hattie.

Accuracy.—(River) Gage heights from continuous records except as noted. Rating curve well defined below 1,200 second-feet. Records good except during winter, for which they are fair. (Canal) Gage probably read twice daily during 1912-13; May 21 to June 30, 1916; during 1917; and once daily for remainder of period. Records fair.

Monthly Discharge of Laramie River near Woods, Wyo., for 1912-1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
1912				
May	1,580	0	428	26,300
June	1,900	200	1,040	61,900
July	1,040	152	338	20,800
August	282	10	67.1	4,130
September	95	10	48.3	2,870
The period				
1912-13				
October	128	86	104	6,400
November	110	0	69.9	4,160
December	55	20	37.6	2,310
January	52	20	39.5	2,430
February	44	25	36.0	2,000
March	169	28	45.6	2,800
April	301	66	184	10,900
May	550	89	262	16,100
June	450	74	260	15,500
July	181	6	64.7	3,980
August	80	10	40.1	2,470
September	63	15	32.2	1,920
The year	550	0	97.9	71,000
1913-14				
October	118	0	43.2	2,660
November	77	26	59.8	3,560
December	60	30	51.8	3,180
January	52	40	46.2	2,840
February	57	40	47.0	2,610
March	73	45	54.6	3,360
April	203	70	130	7,740
May	2,030	203	993	61,000
June	2,400	293	1,020	60,700
July	342	73	153	9,410
August	107	21	41.3	2,540
September	45	10	18.6	1,110
The year	2,400	0	222	161,000

Monthly Discharge of Laramie River Near Woods, Wyo., for 1912-1921—Continued

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
1914–15				
October	129	38	71.9	4,420
November	75	32	50.2	2,990
December	54	23	30.2	1,860
January	28	19	24.8	1,520
February	41	25	32.6	1,810
March	45	31	35.4	2,180
April	217	45	129	7,680
May	515	47	254	15,600
June	765	222	441	26,200
July	235	26	89.9	5,530
August	43	15	25.3	1,560
September	64	15	34.8	2,070
The year	765	15	101	73,400
[fol. 1637]				
1915–16				
October	91	15	54.8	3,370
November	66	12	49.5	2,950
December	63	30	46.5	2,860
January	63	42	51.6	3,170
February	66	42	52.9	3,040
March	110	42	69.3	4,260
April	322	32	91.1	5,420
May	940	239	619	38,100
June	940	322	697	41,500
July	293	53	150	9,220
August	147	24	583	3,580
September	128	15	47.2	2,810
The year	940	12	166	120,000
1916–17				
October	68	15	42.7	2,630
November	96	12	64.3	3,830
December	84	60	68.9	4,240
January	71	44	57.4	3,530
February	60	35	52.6	2,920
March	68	33	43.3	2,660
April	208	55	121	7,200
May	1,420	93	458	28,200
June	2,910	378	1,750	104,000
July	170	231	738	45,400
August	222	81	129	7,930
September	76	33	56.3	3,350
The year	2,910	33	298	216,000
1918				
March 25–31	118	90	103	1,430
April	153	63	102	6,070
May	1,470	118	829	51,000
June	1,920	333	1,290	76,800
July	530	73	204	12,500
August	73	15	39.6	2,430
September	138	48	88.0	5,240
The period	.....	.....	.....	155,000

Monthly Discharge of Laramie River Near Woods, Wyo., for 1912–1921—Continued

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
1918–19				
October	68	26	52.7	3,240
April	345	60	130	7,740
May	640	194	391	24,000
June	412	63	223	13,300
July	71	6	27.8	1,710
August	111	8	21.1	1,300
September	40	4	17.5	1,040
1920				
May 4–31	1,920	314	956	53,100
June	2,100	680	1,310	78,000
July	680	55	197	12,100
August	121	9	59.3	3,650
September	87	46	60.8	3,620
The period	.....	.....	.....	150,000
1920–21				
October	76	31	55.0	3,380
November	102	48	72.7	4,330
December 1–11	93	58	64.0	1,400
March 11–31	96	44	69.1	2,880
April	177	48	91.3	5,430
May	1,920	153	842	51,800
June	2,370	492	1,460	86,900
July	434	105	225	13,800
August	242	47	110	6,760
September	93	15	35.1	2,090

Monthly Discharge of Pioneer Canal Near Woods, Wyo., for 1912–1921

Month	Discharge in second-feet			Run-off in acre-feet
[fol. 1638] 1912	Maximum	Minimum	Mean	
May	700	50	222	13,600
June	815	149	540	32,100
July	517	55	221	13,600
August	104	47	60.5	3,720
September 1–25	51	7	38.2	1,890
The period	.....	.....	.....	64,900
1913				
January 14–31	8	1	6.1	218
February	7	6	6.5	361
March	9	6	8.0	492
April	212	1	29.2	1,740
May	520	244	361	22,200
June	515	114	187	11,100
July	122	4	47.0	2,890
August	40	4	10.8	664
September	40	4	18.7	1,110
The period	520	.....	.....	40,800

Monthly Discharge of Pioneer Canal Near Woods, Wyo., for 1912–1921—Continued

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
1913–14				
October	40	2	18.0	1,110
November	2	2	2.0	119
December	1	1	1.0	61
May	154	1	54.4	3,340
June	731	62	311	18,500
July	165	26	69.2	4,250
August	31	21	24.6	1,510
September	28	8	17.8	1,060
1914–15				
October	8	2	4.0	236
April	76	0	3.0	179
May	128	20	77.9	4,790
June	107	92	98.8	5,880
July	87	44	50.2	3,090
August	41	34	39.2	2,410
September	35	28	28.2	1,680
1915–16				
October	35	2	10.3	633
November	2	2	2.0	119
December	2	2	2.0	123
January	2	2	2.0	123
February	2	2	2.0	115
March	46	2	4.84	298
April	67	44	57.6	3,430
May	101	66	72.0	4,430
June	118	91	104	6,190
July	99	72	74.8	4,600
August	72	61	67.0	4,120
September	61	42	48.0	2,860
The year	118	2	37.2	27,000
1916–17				
October	70	47	62.2	3,820
November	70	2	22.4	1,330
December	.....	.....	2	123
January	.....	.....	2	123
February	.....	.....	2	111
March	.....	.....	2	123
April	34	2	5.4	321
May	420	40	158	9,720
June	818	119	619	36,800
July	657	106	155	9,530
August	101	14	52.9	3,250
September	20	13	13.4	797
The year	818	.....	91.2	66,000
1918				
March 25–31	4	4	4.0	56
April	4	4	4.0	238
May	60	5	22.6	1,390
June	95	60	92.2	5,490
July	80	12	37.7	2,320
August	36	16	28.6	1,760
September	2	2	2.0	119
The period	.....	.....	.....	11,400

[fol. 1639]

Monthly Discharge of Pioneer Canal Near Woods, Wyo., for 1912-1921—Continued

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
1919				
April	.....	.....	4	238
May	148	2	72.2	4,440
June	94	52	68.5	4,080
July	65	34	48.1	2,960
August	62	20	36.1	2,220
September	31	2	20.9	1,240
The period	.....	.....	.....	15,200
1920				
May	595	4	122	7,500
June	363	158	275	16,400
July	174	96	131	8,060
August	106	28	78.9	4,850
September	25	10	17.2	1,020
The period	.....	.....	.....	37,800
1921				
April	.....	.....	10	595
May	90	12	38.9	2,390
June	230	77	127	7,560
July	109	54	86.9	5,340
August	53	37	44.2	2,720
September	36	14	21.1	1,260
The period	.....	.....	.....	19,900

Monthly Discharge of Laramie River and Pioneer Canal Near Woods, Wyo., for 1912-1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
1912				
May	.....	.....	650	39,900
June	.....	.....	1,580	94,000
July	.....	.....	559	34,400
August	.....	.....	128	7,850
September	.....	.....	86.5	4,760
The period	.....	.....	.....	181,000
1912-13				
October	.....	.....	104	6,400
November	.....	.....	69.9	4,160
December	.....	.....	37.6	2,310
January	55	21	43.1	2,650
February	50	34	42.4	2,350
March	178	34	53.6	3,300
April	445	86	213	12,700
May	1,060	341	623	38,300
June	959	196	447	26,600
July	202	70	111	6,820
August	84	30	50.9	3,130
September	74	30	50.8	3,020
The year	.....	.....	.....	112,000

Monthly Discharge of Laramie River and Pioneer Canal Near Woods, Wyo. for 1912–1921—Continued

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
1913–14				
October	120	37	61.8	3,800
November	79	28	61.8	3,680
December	61	31	52.8	3,250
January	51	41	46.2	2,840
February	58	46	47.0	2,610
March	74	46	54.6	3,360
April	204	71	130	7,740
May	2,080	204	1,050	64,400
June	2,600	437	1,330	79,200
July	507	111	222	13,700
August	134	42	65.9	4,050
September	73	30	36.4	2,170
The year	2,600	28	184	191,000
1914–15				
October	129	38	71.9	4,420
November	75	32	50.2	2,990
December	54	23	30.2	1,860
January	28	19	24.8	1,520
February	41	25	32.6	1,810
March	45	31	35.4	2,180
April	217	45	132	7,860
May	563	98	332	20,400
June	872	314	540	32,100
July	290	70	140	8,610
August	81	49	64.5	3,970
September	92	45	63.0	3,750
The year	872	19	126	91,500
1915–16				
October	93	17	65.1	4,000
November	68	14	51.5	3,060
December	65	32	48.5	2,980
January	65	44	53.6	3,300
February	68	44	54.9	3,160
March	112	44	74.1	4,560
April	389	84	149	8,870
May	1,010	305	691	42,500
June	1,030	440	801	47,700
July	392	125	224	13,800
August	219	86	125	7,690
September	171	65	95.1	5,660
The year	1,030	14	203	147,000
1916–17				
October	121	85	105	6,460
November	98	82	86.7	5,160
December	86	62	70.9	4,360
January	73	49	59.4	3,650
February	65	37	54.6	3,030
March	70	35	45.3	2,790
April	218	57	126	7,500
May	1,350	163	616	37,900

Monthly Discharge of Laramie River and Pioneer Canal Near Woods, Wyo. for 1912–1921—Continued

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
1916–17				
June	3,420	839	2,370	141,000
July	2,360	342	893	54,900
August	323	97	182	11,200
September	91	46	69.7	4,150
The year	3,420	35	389	282,000
1918				
March 25–31	122	94	107	1,490
April	157	67	106	6,310
May	1,530	123	851	52,300
June	2,020	428	1,390	82,700
July	567	102	246	15,100
August	110	50	78.0	4,800
September	83	60	72.7	4,330
The period	.....	.....	.....	167,000
1919				
April	.....	.....	134	7,970
May	748	196	463	28,500
June	486	126	292	17,400
July	136	40	75.9	4,670
August	154	28	57.2	3,520
September	67	26	38.4	2,280
The period	.....	.....	.....	64,300
1920				
May	2,230	318	1,080	66,400
June	2,440	857	1,580	94,000
July	854	151	328	20,200
August	227	79	138	8,480
September	104	56	78	4,640
The period	.....	.....	.....	194,000

[fols. 1641-1647]

1920–21				
October	82	37	61.0	3,750
November	108	54	78.7	4,680
December	.....	.....	48	2,950
January	.....	.....	45	2,770
February	.....	.....	45	2,500
March	.....	.....	60	3,690
April	225	60	101	6,010
May	2,030	230	881	54,200
June	2,480	546	1,590	94,600
July	543	159	312	19,200
August	288	86	154	9,470
September	127	29	56.2	3,340
The year	2,480	.....	286	207,000

[fol. 1648] Little Laramie River Near Filmore, Wyo.

(Known as Little Laramie River near Hatton in 1902-3.)

Location.—In sec. 9, T. 15 N., R. 77 W., at private bridge at May's ranch, 1½ miles south of Filmore, Albany County. No important tributary between station and junction of North, Middle, and South forks, 4 miles above.

[fol. 1649] Drainage Area.—155 square miles (measured on base map of Wyoming; scale 1:500,00).

Records Available.—July 5, 1902, to September 30, 1903; May 14, 1911, to September 30, 1921. State engineer maintained station during 1913 and 1914.

Gage.—Vertical staff at downstream end of left bridge abutment. Gage used since April 1, 1915, was referred to datum 0.21 foot lower than gage at same location used during 1911 and 1912.

Extremes of Discharge.—1902, 1903; 1911-1921. Maximum stage recorded, 5.9 feet at 7 a. m. June 1, 1914 (discharge, 2,400 second-feet); minimum stage recorded, 0.25 foot September 19-20, 1913 (discharge, 1 second-foot).

Diversions.—Prior to July 1, 1921, adjudicated diversions of 43 second-feet from the Little Laramie above station and 254 second-feet from tributaries entering above.

Accuracy.—Gage read twice daily. Rating curve well defined except for periods of shifting control. Records good except from 1917 to 1920, for which they are considered excellent, and during winter for which they are fair.

Monthly Discharge of Little Laramie River Near Filmore, Wyo., for 1902, 1903, 1911–1913, 1915–1921

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
1902				
July 5–31	129	43	75.7	4,050
August	43	17	27.6	1,700
September	154	10	37.7	2,240
The period	.....	.....	.....	7,990
1902-3				
October	53	43	46.2	2,840
November	53	29	39.3	2,340
December	.....	.....	30	1,840
January	.....	.....	25	1,540
February	.....	.....	25	1,390
March	.....	.....	30	1,840
April	196	.....	115	6,840
May	586	64	222	13,600
June	1,720	302	1,220	72,600

Monthly Discharge of Little Laramie River Near Filmore, Wyo., for 1902, 1903 1911–1913, 1915–1931—Continued

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
1902–3				
July	700	98	207	12,700
August	98	64	65	4,000
September	.....	.....	50	2,980
The year	1,720	.....	173	125,000
1911				
May 14–31	555	177	287	10,200
June	930	212	530	31,500
July	225	68	128	7,870
August	68	12	39.4	2,420
September	27	12	18.8	1,120
The period	.....	.....	.....	53,100
1911–12				
October	75	17	37.9	2,330
November	.....	.....	25	1,490
December	.....	.....	25	1,540
January	.....	.....	20	1,230
February	.....	.....	20	1,150
March	.....	.....	25	1,540
April	107	.....	42	2,500
May	638	66	220	13,500
June	1,440	435	912	54,300
July	772	215	377	23,200
August	375	64	126	7,750
September	145	46	74.7	4,440
The year	1,440	.....	159	115,000
[fol. 1650]				
1912–13				
October	107	41	77.2	4,750
November	.....	.....	50	2,980
December	.....	.....	40	2,460
January	.....	.....	35	2,150
February	.....	.....	35	1,940
March	.....	.....	40	2,460
April	107	.....	64	3,810
May	802	54	337	20,700
June	712	170	375	22,300
July	275	61	110	6,760
August	68	13	35.0	2,150
September	16	1	8.8	524
The year	802	.....	101	73,000
1913–14				
October	42	13	18.4	1,130
November	.....	.....	20	1,190
December	.....	.....	15	922
January	.....	.....	15	922
February	.....	.....	15	833
March	.....	.....	25	1,540
April	150	.....	80	4,760
May	1,420	98	375	23,100
June	2,400	175	692	41,200

Monthly Discharge of Little Laramie River Near Filmore, Wyo., for 1902, 1903, 1911–1913, 1915–1921—Continued

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
1913–14				
July	338	89	163	10,000
August	127	35	55.0	3,380
September	35	20	26.4	1,570
The year	2,400	.....	125	90,500
1914–15				
October	35	20	28.5	1,750
November	.....	.....	35	2,080
December	.....	.....	30	1,840
January	.....	.....	25	1,540
February	.....	.....	25	1,390
March	.....	.....	28	1,720
April	152	29	55.8	3,320
May	470	61	200	12,300
June	735	140	317	18,900
July	152	44	70.7	4,350
August	79	27	41.2	2,530
September	67	20	37.0	2,200
The year	735	.....	74.5	53,900
1915–16				
October	79	36	45.0	2,770
November	.....	.....	35	2,080
December	.....	.....	30	1,840
January	.....	.....	25	1,540
February	.....	.....	25	1,440
March	.....	.....	25	1,540
April	430	13	94.4	5,620
May	388	33	209	12,900
June	656	190	405	24,100
July	178	73	114	7,010
August	127	27	57.0	3,500
September	36	12	18.8	1,120
The year	656	.....	90.3	65,500
1916–17				
October	47	19	28.2	1,730
November	.....	.....	20	1,190
December	.....	.....	18	1,110
January	.....	.....	18	1,110
February	.....	.....	15	833
March	.....	.....	18	1,110
April	102	.....	62	3,690
May	388	54	191	11,700
June	1,840	251	1,130	67,200
July	1,220	208	572	35,200
August	192	53	96.3	5,920
September	56	30	38.9	2,310
The year	1,840	.....	184	133,000

[fols. 1651–1868]

Monthly Discharge of Little Laramie River Near Filmore, Wyo., for 1902, 1903, 1911–1913, 1915–1921—Continued

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
1917–18				
October	45	28	31.3	1,920
November	46	29	37.7	2,240
December	.....	.....	25	1,540
January	.....	.....	25	1,540
February	.....	.....	20	1,110
March	.....	.....	40	2,460
April	93	28	51.8	3,080
May	611	56	222	13,600
June	1,600	285	1,030	61,300
July	436	87	211	13,000
August	102	29	58.9	3,620
September	62	29	44.5	2,650
The year	1,600	.....	149	108,000
1913–19				
October	59	28	38.1	2,340
November	.....	.....	30	1,790
December	.....	.....	25	1,540
January	.....	.....	20	1,230
February	.....	.....	20	1,110
March	.....	.....	25	1,540
April	94	21	50.5	3,000
May	832	80	305	18,800
June	365	87	187	11,100
July	148	24	52.7	3,240
August	148	8	26.5	1,630
September	13	7	9.5	565
The year	832	.....	66.2	47,900
1919–20				
October	39	9	17.9	1,100
November	.....	.....	10	595
December	.....	.....	15	922
January	.....	.....	15	922
February	.....	.....	15	863
March	.....	.....	20	1,230
April	87	22	50.7	3,020
May	1,070	87	280	17,200
June	1,520	460	929	55,300
July	344	87	182	11,200
August	128	50	87.0	5,350
September	70	33	43.7	2,600
The year	1,520	.....	138	100,000
1920–21				
October	49	33	37.9	2,330
November	46	32	40.1	2,390
December	.....	.....	25	1,540
January	.....	.....	20	1,230
February	.....	.....	20	1,110
March 15–31	48	.....	25	1,540
April	84	33	46.0	2,740
May	1,100	62	287	17,600
June	1,640	330	941	56,000
July	306	101	193	11,900

Monthly Discharge of Little Laramie River Near Filmore, Wyo., for 1902, 1903, 1911–1913, 1915–1921—Continued

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
1920–21				
August	152	44	79.7	4,900
September	42	23	29.6	1,760
The year	1,640	.....	145	105,000

Note.—Records for 1902 and 1913 revised. Winter records estimated.

[fol. 1869] COMP. EXHIBIT 43

Laramie River Near Jelm

Location.—In sec. 15, T. 12 N., R. 77 W., just below highway bridge at Boswell's ranch, a quarter of a mile below Colorado-Wyoming line, 4 miles south of old Jelm, Albany County. Stuck Creek enters 1 mile upstream.

Drainage area.—297 square miles.

Records available.—May 7, 1911 to September 30, 1922. From June 22, 1904, to October 31, 1905, station maintained at Decker's ranch, half a mile south of state line.

Gage.—Friez water-stage recorder moved September 4, 1921 from middle pier of bridge to right bank 30 feet downstream from bridge; inspected by Mrs. C. D. Oviatt.

Diversions.—Court decrees for diversion of 292 second-feet from Laramie River between Glendevey and Jelm stations.

Accuracy.—Gage heights from continuous record except as explained in foot note to daily discharge table; rating curves well defined, applied indirectly for shifting control June 4 to July 9, 1921. Records good except during high water in 1921, for which they are fair.

Monthly Discharge of Laramie River, Near Jelm, for the Years Ending September 30, 1921 and 1922

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
1920–21				
October	75	52	59.7	3,670
May	1,600	124	584	35,900
June	2,160	602	1,410	83,900
July	542	131	314	19,300
August	242	78	123	7,560
September	111	49	62.4	3,710
1921–22				
October	69	34	49.0	3,010
April 22–30	124	96	112	2,000
May	910	120	335	20,600
June	825	236	499	29,700
July	226	71	121	7,440
August	102	50	68.6	4,220
September	48	27	37.0	2,200

[fol. 1870]

Daily Discharge, in Second-Feet, of Laramie River, near Jelm, for the Years Ending September 30, 1921 and 1922

Day 1920–1921	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	57	....	....	....	....	....	....	124	1620	542	163	111
2	55	....	....	....	....	....	....	148	1520	524	199	99
3	53	....	....	....	....	....	....	179	1470	530	173	97
4	55	....	....	....	....	....	....	218	1500	536	154	82
5	55	....	....	....	....	....	....	250	1540	465	131	76
6	53	....	....	....	....	....	....	278	1560	407	108	70
7	55	....	....	....	....	....	....	347	1750	380	102	62
8	53	....	....	....	....	....	....	318	2160	356	97	60
9	53	....	....	....	....	....	....	288	1990	344	95	62
10	55	....	....	....	....	....	....	267	2010	344	118	61
11	57	....	....	....	....	....	....	260	2030	340	121	61
12	66	....	....	....	....	....	....	281	2030	340	99	61
13	75	....	....	....	....	....	....	307	2020	330	202	56
14	73	....	....	....	....	....	....	343	2000	320	170	54
15	71	....	....	....	....	....	....	384	2150	310	242	50
16	67	....	....	....	....	....	....	430	2100	299	154	49
17	66	....	....	....	....	....	....	470	1600	270	116	49
18	67	....	....	....	....	....	....	597	1600	384	97	55
19	67	....	....	....	....	....	....	611	1410	299	93	76
20	73	....	....	....	....	....	....	506	1090	250	102	62
21	64	....	....	....	....	....	....	566	863	225	97	55
22	62	....	....	....	....	....	....	668	792	253	95	50
23	60	....	....	....	....	....	....	780	800	355	108	49
24	55	....	....	....	....	....	....	930	809	245	118	49
25	55	....	....	....	....	....	....	940	818	200	108	54
26	58	....	....	....	....	....	....	820	716	180	97	55
27	56	....	....	....	....	....	....	940	614	155	84	54
28	54	....	....	....	....	....	....	1330	626	145	78	52
29	54	....	....	....	....	....	....	1410	632	140	99	52
30	54	....	....	....	....	....	82	1500	602	131	86	50
31	52	....	....	....	....	....	....	1600	....	131	97	....
1921–1922												
1	48	....	....	....	....	....	....	120	604	226	79	48
2	48	....	....	....	....	....	....	120	566	222	94	48
3	48	....	....	....	....	....	....	120	529	194	102	47
4	47	....	....	....	....	....	....	120	559	167	89	45
5	47	....	....	....	....	....	....	160	559	161	76	44
6	48	....	....	....	....	....	....	196	610	167	71	44
7	58	....	....	....	....	....	....	219	665	216	67	44
8	61	....	....	....	....	....	....	230	780	172	66	43
9	61	....	....	....	....	....	....	258	825	160	64	43
10	69	....	....	....	....	....	....	265	672	145	61	43
11	62	....	....	....	....	....	....	226	700	130	62	43
12	59	....	....	....	....	....	....	187	708	124	64	43
13	58	....	....	....	....	....	....	169	716	113	61	38
14	58	....	....	....	....	....	....	150	658	102	66	35
15	59	....	....	....	....	....	....	140	565	107	72	30
16	61	....	....	....	....	....	....	124	523	90	66	28
17	58	....	....	....	....	....	....	132	500	90	67	29
18	54	....	....	....	....	....	....	169	460	89	72	30
19	48	....	....	....	....	....	....	291	435	85	67	31
20	42	....	....	....	....	....	....	335	405	83	79	34
21	35	....	....	....	....	....	....	391	373	88	81	34
22	35	....	....	....	....	....	96	343	351	92	78	33
23	34	....	....	....	....	....	109	396	339	81	71	30
24	34	....	....	....	....	....	107	478	315	74	64	27
25	36	....	....	....	....	....	107	572	307	72	64	27
26	38	....	....	....	....	....	113	578	275	72	61	27

Daily Discharge, in Second-Feet, of Laramie River, near Jelm, for the Years Ending September 30, 1921 and 1922—Continued

Day 1921–22									
27	40	124	658	254	71	58	27
28	42	122	798	250	72	51	35
29	44	113	843	244	113	50	47
30	44	115	910	236	89	53	34
31	44	....	679	....	78	50	....

Note—No gage height record October 24-31, 1920; June 12-14, 16-17, July 10-15, October 17-31, 1921; September 3-17, 1922; discharge based on records of Glendevey and Woods stations.

[fol. 1871] Laramie River and Pioneer Canal Near Woods

Location.—In sec. 36, T. 14 N., R. 77 W., at diversion dam for Pioneer Canal, two miles above Woods postoffice, Albany County. Nearest important tributary, Fox Creek, enters three miles above.

Drainage area.—409 square miles.

Records available.—April 16, 1912, to September 30, 1922. From 1895 to 1900, and from May 7 to November 11, 1911, a station was maintained at Woods Landing in sec. 11, T. 13 N., R. 77 W. The records are not directly comparable as Fox Creek enters between and a few small ditches divert water.

Gage.—Bristol float-type water-stage recorder whose datum is the crest of the dam. Gage originally located at left end of dam just below Pioneer Canal headgates. On September 23, 1915, gage was moved to upper wing wall of headgates, and although it is actually above the canal intake it still indicates the amount passing the dam as it is in the pool formed by diversion dam. Chain gage in Pioneer Canal is located at the Johnson bridge 1½ miles below intake. It is read by an employee of the Laramie Water Company.

Diversions.—By decree of district court dated December 27, 1912, there were adjudicated diversions of approximately 10 second-feet from Laramie River between the State line and Pioneer dam, exclusive of the Pioneer Canal, which has rights for 282 second-feet.

Regulation.—None, as pond above dam is too small to have any appreciable effect on flow. Whenever canal headgates are closed the discharge over dam increases.

Accuracy.—River: Gage heights from continuous record; rating curves well defined. Records excellent. Canal: Gage read once a week; rating curves well defined. Records roughly approximate.

Monthly Discharge of Laramie River, Near Woods, for the Years Ending September 30, 1921 and 1922

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
1920–21				
October	76	31	55.0	3,380
November	102	48	72.7	4,330
December 1–11	93	58	64.0	1,400
March 11–31	96	44	69.1	2,880
April	177	48	91.3	5,430
May	1,920	153	842	51,800
June	2,370	492	1,460	86,900
July	434	105	225	13,800
August	242	47	110	6,760
September	93	15	35.1	2,090
1921–22				
October	65	35	47.2	2,900
November	44	15	33.7	2,010
December	29	19	21.7	473
March 23–31	128	78	102	1,820
April	169	29	77.7	4,620
May	1,140	114	433	26,600
June	993	173	564	33,600
July	161	9	56.7	3,490
August	31	6	19.4	1,190
September	28	2	11.4	678

[fol. 1872]

Daily Discharge, in Second-Feet, of Laramie River near Woods, for the Years Ending September 30, 1921 and 1922

Day 1920–1921	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	46	73	93	....	....	....	48	153	1920	434	125	90
2	46	87	63	....	....	....	51	185	1830	392	173	93
3	46	55	60	....	....	....	63	226	1780	372	153	81
4	44	51	60	....	....	....	87	327	1740	345	138	71
5	42	68	63	....	....	....	99	419	1700	412	118	53
6	35	68	68	....	....	....	81	499	1650	284	110	42
7	33	73	63	....	....	....	73	600	1650	247	102	40
8	31	76	58	....	....	....	71	514	1800	208	100	33
9	33	65	60	....	....	....	65	448	2010	185	104	35
10	40	71	58	....	....	....	58	412	2100	172	115	35
11	48	63	58	....	....	81	65	358	2100	181	135	35
12	44	65	....	....	....	81	78	378	2100	185	125	26
13	40	73	....	....	....	55	71	462	2010	185	200	20
14	60	81	....	....	....	68	73	530	1920	203	185	17
15	63	84	....	....	....	73	81	600	2010	181	242	15
16	60	78	....	....	....	73	58	720	2370	181	145	15
17	63	76	....	....	....	73	96	800	1920	217	99	19
18	63	87	....	....	....	76	96	1000	1650	280	81	19
19	63	84	....	....	....	90	90	1040	1650	345	71	26
20	63	81	....	....	....	96	111	880	1120	231	73	28
21	65	102	....	....	....	81	102	960	920	181	81	22
22	68	71	....	....	....	81	87	1000	800	190	81	20
23	70	76	....	....	....	71	114	1160	760	202	47	22
24	71	48	....	....	....	68	177	1380	720	242	103	22
25	71	60	....	....	....	65	145	1470	760	165	90	22
26	76	65	....	....	....	48	131	1250	720	153	78	31
27	51	65	....	....	....	58	125	1250	600	138	60	31
28	58	60	....	....	....	65	111	1650	600	128	55	31
29	68	76	....	....	....	60	108	1740	545	111	55	30
30	73	99	....	....	....	44	125	1780	492	105	93	30
31	71	....	....	....	....	44	....	1920	....	108	76	....

Daily Discharge, in Second-Feet, of Laramie River near Woods, for the Years Ending September 30, 1921 and 1922—Continued

1921–1922	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	46	37	29	....	....	....	76	125	792	161	17	15
2	46	40	24	....	....	....	71	121	680	153	29	12
3	46	42	26	....	....	....	90	149	665	131	24	10
4	46	44	22	....	....	....	105	173	650	111	26	10
5	40	35	20	....	....	....	131	208	665	95	28	6
6	42	33	19	....	....	....	125	271	728	90	22	4
7	48	33	22	....	....	....	105	297	784	140	19	3
8	60	31	20	....	....	....	99	286	908	92	15	2
9	63	22	19	....	....	....	81	324	967	84	15	4
10	65	15	19	....	....	....	58	308	993	76	14	15
11	53	44	19	....	....	....	42	208	891	68	14	17
12	46	42	....	....	....	....	46	161	784	60	14	14
13	51	40	....	....	....	....	35	177	752	60	10	10
14	55	40	....	....	....	....	29	157	728	44	12	14
15	55	33	....	....	....	....	35	138	628	42	19	12
16	51	28	....	....	....	....	29	114	538	35	22	10
17	48	37	....	....	....	....	29	153	481	28	22	8
18	46	37	....	....	....	....	29	286	447	14	24	9
19	46	33	....	....	....	....	29	440	447	12	28	10
20	46	33	....	....	....	....	40	440	460	20	29	12
21	44	44	....	....	....	....	46	538	421	14	19	12
22	42	40	....	....	....	....	60	460	408	22	31	10
23	40	31	....	....	....	90	87	530	383	23	24	12
24	40	28	....	....	....	108	105	650	365	24	19	10
25	43	28	....	....	....	128	99	824	303	26	14	10
26	46	28	....	....	....	118	125	857	261	17	12	12
27	48	28	....	....	....	108	169	950	231	9	10	15
28	35	28	....	....	....	102	111	993	203	14	6	17
29	44	28	....	....	....	96	114	1050	185	37	20	20
30	42	29	....	....	....	93	131	1140	173	33	22	28
31	40	....	....	....	....	78	....	900	....	24	20	....

[fol. 1873]

Monthly Discharge of Pioneer Canal, near Woods, for the Years Ending September 30, 1921 and 1922

Month	Discharge in second-feet			Run-off in acre-feet
1921	Maximum	Minimum	Mean	
April	....	....	10	595
May	90	12	38.9	2,390
June	230	77	127	7,560
July	109	54	86.9	5,340
August	53	37	44.2	2,720
September	36	14	21.1	1,260
The period	....	....	....	19,900
1921–22				
October	18	13	14.8	910
November	19	13	17.8	1,060
December	....	....	19	1,170
January	....	....	19	1,170
February	....	....	19	1,060
March	29	19	19.8	1,220
April	74	17	54.2	3,230
May	77	77	56.8	3,490
June	128	128	92.6	5,510
July	67	67	57.0	3,500
August	65	65	45.3	2,790
September	32	32	23.5	1,400
The year	128	....	36.6	26,500

Note.—Discharge December, 1921, to February, 1922, represents leakage through headgate.

[fol. 1874]

Daily Discharge, in Second-Feet, of Pioneer Canal near Woods, for the Years Ending September 30, 1921 and 1922

Day 1920–1921	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	....	....	....	....	....	....	9	12	77	109	53	36
2	....	....	....	....	....	....	....	12	77	109	53	34
3	12	....	....	....	....	....	....	13	77	108	52	33
4	....	....	....	....	....	....	....	13	92	108	52	32
5	....	....	....	....	....	....	....	13	90	107	51	32
6	....	....	....	....	....	....	....	14	88	105	51	30
7	....	....	....	....	....	....	....	14	88	105	50	28
8	....	....	....	....	....	....	....	14	90	105	50	26
9	....	....	....	....	....	....	12	15	92	105	49	24
10	....	....	....	....	....	....	....	15	96	105	49	22
11	....	....	....	....	....	....	....	15	92	105	48	20
12	....	....	....	....	....	....	....	40	97	105	48	18
13	....	....	....	....	....	....	....	40	200	105	47	16
14	....	....	....	....	....	....	....	40	200	105	47	14
15	....	....	....	....	....	....	....	41	220	105	46	14
16	....	....	....	....	....	....	....	42	230	105	43	14
17	....	....	....	....	....	....	....	44	222	105	40	14
18	....	....	....	....	....	....	....	46	220	105	40	16
19	....	....	....	....	....	....	....	47	180	105	40	18
20	....	....	....	....	....	....	10	47	150	60	40	20
21	....	....	....	....	....	....	....	47	120	60	39	20
22	....	....	....	....	....	....	....	47	116	60	39	19
23	....	....	....	....	....	....	....	48	114	60	39	19
24	....	....	....	....	....	....	....	48	112	58	39	18
25	6	....	....	....	....	....	....	48	112	56	39	18
26	....	....	....	....	....	....	....	49	112	56	39	17
27	....	....	....	....	....	....	....	49	111	56	38	16
28	....	....	....	....	....	....	....	90	111	55	38	16
29	....	....	....	....	....	....	....	85	110	55	37	15
30	....	....	....	....	....	....	12	80	110	54	37	14
31	6	....	....	....	....	....	....	77	....	54	37	....
1921–1922												
1	18	13	....	....	....	....	26	48	86	61	65	32
2	18	13	....	....	....	....	24	48	99	61	63	32
3	18	14	....	....	....	....	22	47	99	61	63	32
4	17	17	....	....	....	....	20	58	99	61	60	32
5	17	17	....	....	....	....	17	65	99	61	56	32
6	17	17	....	....	....	....	25	65	99	61	55	32
7	16	17	....	....	....	....	42	64	100	62	54	32
8	16	17	....	....	....	....	51	63	101	63	53	32
9	16	17	....	....	....	....	74	62	102	63	52	31
10	16	17	....	....	....	....	74	61	106	64	50	30
11	15	17	....	....	....	....	74	60	111	65	48	28
12	15	18	....	....	....	....	74	59	115	63	47	25
13	15	18	....	....	....	....	74	58	127	61	45	24
14	15	18	....	....	....	....	74	58	126	59	42	23
15	15	19	....	....	....	....	74	58	126	57	39	22
16	14	19	....	....	....	....	74	57	125	55	40	21
17	14	19	....	....	....	....	74	56	125	53	40	20
18	14	19	....	....	....	....	74	45	128	51	40	19
19	14	19	....	....	....	....	63	33	108	49	40	18
20	14	19	....	....	....	....	52	32	76	47	41	18
21	14	19	....	....	....	....	52	31	76	45	41	18
22	13	19	....	....	....	....	52	30	76	43	41	17
23	13	19	....	....	....	....	52	46	66	41	42	17
24	13	19	....	....	....	....	52	62	56	39	41	17
25	13	19	....	....	....	....	51	62	56	37	40	17
26	13	19	....	....	....	....	51	62	56	54	38	17
27	13	19	....	....	....	....	51	69	56	67	36	17
28	13	19	....	....	....	19	51	77	58	67	34	17
29	13	19	....	....	....	24	51	76	61	66	33	17
30	13	19	....	....	....	29	50	75	61	66	32	17
31	13	....	....	....	....	29	....	74	....	65	32	....

[fols. 1875-1879]

Combined Monthly Discharge of Laramie River and Pioneer Canal, near Woods, for the Years Ending September 30, 1921 and 1922

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
1920-21				
October	82	40	64.0	3,940
November	107	53	77.7	4,620
December 1-11	104	63	69.0	1,510
March 11-31	104	52	77.1	3,210
April	188	57	101	6,020
May	2,000	230	881	54,200
June	2,700	602	1,590	94,500
July	543	159	312	19,200
August	288	86	154	9,470
September	127	29	56.2	3,340
1921-22				
October	81	48	62.0	3,810
November	63	32	51.5	3,060
December 1-11	48	38	40.7	888
March 23-31	147	107	124	2,210
April	220	92	132	7,860
May	1,220	169	490	30,100
June	1,100	234	657	39,100
July	222	59	114	7,010
August	92	40	64.7	3,980
September	47	27	34.9	2,080

[fol. 1880] Little Laramie River Near Filmore

Location.—In sec. 9, T. 15 N., R. 77 W., at private bridge at May's ranch, 1½ miles south of Filmore, Albany County. No tributary of importance between station and junction of North, Middle and South forks, 4 miles above.

Drainage area.—155 square miles.

Records available.—May 14, 1911, to October 31, 1912; April 1, 1915, to September 30, 1922. State engineer maintained station at this point during 1913 and 1914.

Gage.—Vertical staff at downstream end of left bridge abutment; read by Claude May. Gage used since April 1, 1915, referred to datum 0.21 foot lower than gage at same location used during 1911 and 1912.

Diversions.—Prior to July 1, 1921, there were adjudicated diversions of 43 second-feet from the Little Laramie above station and 254 second-feet from tributaries entering above.

Accuracy.—Gage read twice daily; rating curve well defined. Records good.

Monthly Discharge of Little Laramie River, Near Filmore, for the Years Ending September 30, 1921 and 1922

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
1920–21				
October	49	33	37.9	2,330
November	46	32	40.1	2,390
March 15–31	48	33	38.2	1,290
April	84	33	46.0	2,740
May	1,100	62	287	17,600
June	1,640	330	941	56,000
July	306	101	193	11,900
August	152	44	79.7	4,900
September	42	23	29.6	1,760
1921–22				
October	32	23	26.7	1,640
November	29	20	24.5	1,460
April	86	24	46.4	2,760
May	890	62	211	13,000
June	890	195	491	29,200
July	147	49	88.1	5,420
August	53	33	40.3	2,480
September	36	17	.....	.....

[fols. 1881–2035]

Daily Discharge, in Second-Feet, of Little Laramie River, near Filmore, for the Years Ending September 30, 1921 and 1922

Day 1920–1921	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	39	44	....	....	....	....	33	66	1170	306	122	42
2	37	46	....	....	....	....	33	62	1170	300	152	40
3	37	42	....	....	....	....	34	63	1100	296	122	38
4	34	40	....	....	....	....	37	72	1170	289	101	37
5	34	41	....	....	....	....	40	86	1240	266	104	37
6	34	42	....	....	....	....	37	105	1320	235	96	35
7	33	42	....	....	....	....	37	126	1640	232	99	35
8	33	41	....	....	....	....	34	122	1100	230	107	33
9	34	40	....	....	....	....	34	116	1400	220	113	31
10	36	40	....	....	....	....	35	97	1400	182	99	31
11	40	34	....	....	....	....	39	93	1240	172	93	31
12	40	33	....	....	....	....	40	96	1320	180	79	30
13	41	32	....	....	....	....	40	88	1240	212	89	28
14	46	34	....	....	....	....	37	93	1240	190	85	28
15	49	36	....	....	....	45	36	102	1400	208	93	27
16	42	42	....	....	....	45	33	136	1100	208	79	27
17	40	42	....	....	....	45	50	158	960	182	68	27
18	39	41	....	....	....	48	84	232	960	172	56	27
19	37	41	....	....	....	45	76	232	960	168	59	27
20	39	43	....	....	....	39	51	195	585	161	73	26
21	38	43	....	....	....	36	44	220	558	170	68	27
22	36	42	....	....	....	36	40	260	480	240	58	26
23	34	41	....	....	....	36	40	310	530	165	73	26
24	35	43	....	....	....	36	56	435	480	168	58	26
25	36	42	....	....	....	33	60	558	480	143	54	26
26	34	40	....	....	....	33	47	480	480	124	47	24
27	34	42	....	....	....	34	48	505	412	122	46	24
28	36	40	....	....	....	35	50	700	390	124	45	23
29	40	38	....	....	....	36	72	960	370	120	44	24
30	44	36	....	....	....	35	82	1030	330	101	46	24
31	44	....	....	....	....	33	....	1100	....	105	44	....

Daily Discharge, in Second-Feet, of Little Laramie River, near Filmore, for the Years Ending September 30, 1921 and 1922—Continued

Day 1921-1922	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	23	27					40	64	670	136	49	36
2	26	27					42	62	390	147	48	34
3	26	27					49	62	390	147	51	33
4	26	27					55	63	458	136	48	30
5	26	28					58	104	505	147	42	27
6	26	26					51	104	585	126	40	26
7	26	27					41	90	670	118	40	26
8	26	27					43	102	792	111	34	26
9	27	27					54	104	890	107	34	24
10	26	28					42	102	730	113	35	21
11	26	28					52	109	858	111	35	21
12	26	26					33	105	612	104	34	20
13	27	29					30	104	700	90	34	20
14	27	27					28	84	700	75	35	21
15	26	26					29	75	700	73	34	21
16	26	26					30	72	612	75	33	20
17	26	26					27	75	505	68	40	21
18	26	24					27	97	480	59	47	29
19	26	22					28	104	458	54	47	20
20	26	20					24	99	435	54	53	19
21	26	20					37	136	412	63	51	17
22	26	20					56	147	350	56	47	17
23	26	20					56	158	330	55	42	20
24	27	20					59	220	275	54	47	
25	32	21					61	275	220	58	34	
26	28	22					58	370	208	54	42	
27	30	22					86	505	195	71	36	
28	28	22					71	670	195	93	34	
29	30	22					62	760	195	75	34	
30	28	22					63	890	220	51	36	
31	27							640		49	34	

[fol. 2036] COMP. EXHIBIT 44

Laramie River Near Jelm

Location.—In Sec. 15, T. 12 N., R. 77 W., just below highway bridge at Boswell's ranch, a quarter of a mile below Colorado-Wyoming line, 4 miles south of old Jelm, Albany County. Stuck Creek enters 1 mile upstream.

Drainage area.—297 square miles.

Records available.—May 7, 1911 to September 30, 1924. From June 22, 1904 to October 31, 1905, station maintained at Decker's ranch half a mile south of state line.

Gage.—Bristol float-type water-stage recorded on right bank 30 feet downstream from bridge; inspected by Mrs. C. D. Oviatt.

Diversions.—Water diverted for irrigation of 3,000 acres between Glendevey and Jelm stations.

Accuracy.—Gage-heights from continuous record except as explained in foot note to daily discharge table; rating curves well defined. Records fair for 1923 and good for 1924.

Monthly Discharge of Laramie River Near Jelm, for the Years Ending September 30, 1923 and 1924

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
1922–1923				
October	34	28	31.3	1,920
April 18–30	158	64	102	2,630
May	.....	.....	450	27,700
June	.....	.....	1,480	88,100
July	900	100	396.0	24,300
August	145	60	101	6,210
September	131	38	64.9	3,860
1923–1924				
October	105	54	76.9	4,730
November	96	37	75.9	4,520
April 17–30	126	107	112	889
May	910	114	515	31,700
June	2,020	410	989	58,800
July	361	96	189	11,600
August	92	42	64.6	3,970
September	.....	.....	60	3,570

Note.—Mean for September, 1924 based on comparison with records at Glendevey and Woods stations.

(Id. 2037)

Daily Discharge, in Second-Feet, of Laramie River near Jelm, for the Years Ending September 30, 1923 and 1924

Day 1922–1923	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	33	....	....	....	....	....	....	123	....	570	102	63
2	32	....	....	....	....	....	....	123	....	578	98	65
3	32	....	....	....	....	....	....	123	....	542	100	62
4	31	....	....	....	....	....	....	116	....	508	96	60
5	31	....	....	....	....	....	....	123	....	486	109	58
6	30	....	....	....	....	....	....	....	....	415	144	57
7	30	....	....	....	....	....	....	....	....	436	126	52
8	30	....	....	....	....	....	....	....	1190	475	114	47
9	28	....	....	....	....	....	....	....	3000	554	112	44
10	28	....	....	....	....	....	....	....	3740	800	118	44
11	28	....	....	....	....	....	....	....	....	700	131	38
12	30	....	....	....	....	....	....	....	....	500	130	38
13	32	....	....	....	....	....	....	....	....	450	128	52
14	32	....	....	....	....	....	....	....	....	400	122	44
15	31	....	....	....	....	....	....	....	....	502	125	44
16	31	....	....	....	....	....	....	....	....	415	145	42
17	32	....	....	....	....	....	....	....	....	356	135	70
18	34	....	....	....	....	....	158	....	....	297	115	125
19	34	....	....	....	....	....	152	....	....	266	110	131
20	34	....	....	....	....	....	136	....	....	248	95	102
21	33	....	....	....	....	....	105	....	....	590	90	76
22	33	....	....	....	....	....	81	....	....	405	89	64
23	32	....	....	....	....	....	72	....	....	309	83	65
24	32	....	....	....	....	....	64	....	....	263	71	66
25	32	....	....	....	....	....	64	....	....	238	72	68
26	32	....	....	....	....	....	76	....	....	213	67	69
27	31	....	....	....	....	....	94	....	....	203	66	72
28	31	....	....	....	....	....	102	....	....	187	63	81
29	30	....	....	....	....	....	105	....	....	146	60	81
30	30	....	....	....	....	....	116	....	....	123	60	67
31	30	....	....	....	....	....	....	....	....	100	66	....

Daily Discharge, in Second-Feet, of Laramie River near Jelm, for the Years Ending September 30, 1923 and 1924—Continued

Day 1923–1924	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	90	83	....	....	....	....	....	114	560	361	92	....
2	81	85	....	....	....	....	....	128	646	338	82	....
3	89	79	....	....	....	....	....	161	780	313	80	....
4	98	78	....	....	....	....	....	230	856	281	79	....
5	89	80	....	....	....	....	....	266	950	270	83	....
6	89	96	....	....	....	....	....	244	1080	281	83	....
7	81	95	....	....	....	....	....	224	1280	293	76	....
8	76	94	....	....	....	....	....	241	1300	334	72	61
9	67	89	....	....	....	....	....	210	1030	274	72	....
10	72	85	....	....	....	....	....	206	980	234	76	....
11	81	71	....	....	....	....	....	259	1090	238	76	....
12	85	71	....	....	....	....	....	361	1340	220	71	....
13	67	78	....	....	....	....	....	448	1730	193	72	....
14	61	78	....	....	....	....	....	502	2000	168	74	....
15	64	78	....	....	....	....	....	524	2020	146	71	....
16	60	80	....	....	....	....	....	590	1710	146	66	....
17	61	80	....	....	....	....	....	660	1560	171	62	....
18	58	80	....	....	....	....	....	788	1230	180	60	....
19	67	81	....	....	....	....	....	772	1120	165	60	....
20	54	82	....	....	....	....	....	732	788	140	55	....
21	67	83	....	....	....	....	....	756	732	107	55	....
22	66	84	....	....	....	....	....	788	708	109	56	....
23	79	85	....	....	....	....	....	865	632	102	56	....
24	81	79	....	....	....	....	....	692	625	100	56	....
25	89	66	....	....	....	....	....	780	572	98	55	....
26	105	37	....	....	....	....	....	892	542	98	48	....
27	83	46	....	....	....	....	126	910	497	98	45	....
28	81	55	....	....	....	....	107	756	458	100	45	....
29	81	50	....	....	....	....	107	676	431	108	42	62
30	81	50	....	....	....	....	107	611	410	100	42	67
31	81	....	....	....	....	....	....	584	....	96	42	69

Note.—No gage-height record October 1-6, 20, 21, 29-31, 1922, May 6 to June 7, June 11-30, July 10-13, August 12-21, 27-31, September 1-18, 23-25, November 16-22, 1923, July 18-20, 29-31, August 1-3, 28-31, 1924; discharge based on comparison with records of Laramie River near Woods except for November, 1923, for which period they were estimated.

[fol. 2038] Laramie River and Pioneer Canal Near Woods

Location.—In Sec. 36, T. 14 N., R. 77 W., at diversion dam for Pioneer Canal, two miles from Woods postoffice, Albany County. Nearest important tributary, Fox Creek, enters three miles above.

Drainage area.—409 square miles.

Records available.—April 16, 1912, to September 30, 1924. From 1890 to 1900, and from May 7 to November 11, 1911, a station was maintained at Woods Landing in Sec. 11, T. 13 N., R. 77 W. The records are not directly comparable, as Fox Creek enters between and a few small ditches divert water.

Gage.—Bristol float-type water-stage recorder whose datum is the crest of the dam. Bristol water-stage recorder in Pioneer Canal is located at the Johnson bridge 1½ miles

below intake; read by an employee of the Laramie Water Company.

Diversions.—Water diverted for irrigation of 700 acres from Laramie River between Jelm and Woods stations, exclusive of diversion by Pioneer Canal.

Accuracy.—River; gage heights from continuous record; rating curve well developed. Records excellent. Canal: Gage heights from continuous record; rating curves well defined except for short periods when control shifted slightly. Records good.

Monthly Discharge of Laramie River Near Woods, for the Years Ending September 30, 1923 and 1924

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
1922–1923				
October	25	11	14.6	898
April 10–30	125	37	71.6	2,980
May	1,040	91	399	24,500
June	4,010	369	1,320	78,600
July	716	82	315	19,400
August	107	16	57.5	3,540
September	118	1	48.8	2,900
1923–1924				
October	125	67	91.2	2,890
April 15–30	280	144	198	6,280
May	1,370	151	786	48,300
June	2,040	301	1,120	66,600
July	250	1	94.4	5,800
August	48	6	14.2	873
September	34	3	14.4	857

[fol. 2039]

Daily Discharge, in Second-Feet, of Laramie River near Woods, for the Years Ending September 30, 1923 and 1924

Day	1922–1923 Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	25	25						99	1010	334	79	27
2	20	27						98	908	369	76	27
3	18	27						96	916	450	73	27
4	16							91	1020	399	73	18
5	15							100	916	345	67	13
6	13							99	764	260	89	22
7	13							111	860	285	89	16
8	13							178	884	369	67	9
9	13							226	2040	716	61	3
10	13						55	270	4010	588	61	1
11	13						76	345	3200	399	65	1
12	13						64	280	2470	357	70	30
13	16						64	235	2240	334	73	41
14	16						39	212	2010	270	61	45
15	16						61	255	1850	418	76	48
16	16						76	250	1860	381	107	48
17	15						73	250	1880	280	89	52

Daily Discharge, in Second-Feet, of Laramie River near Woods, for the Years Ending September 30, 1923 and 1924—Continued

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1922-1923												
18	13	....	....	....	....	....	104	238	1520	212	58	61
19	12	....	....	....	....	....	125	229	1280	194	52	100
20	12	....	....	....	....	....	122	225	1140	212	52	118
21	12	....	....	....	....	....	67	439	1080	668	39	96
22	12	....	....	....	....	....	76	596	780	363	37	76
23	11	....	....	....	....	....	70	652	628	270	43	73
24	11	....	....	....	....	....	39	556	484	208	45	70
25	11	....	....	....	....	....	37	692	612	199	37	73
26	12	....	....	....	....	....	39	780	796	203	27	64
27	13	....	....	....	....	....	66	982	876	203	28	76
28	13	....	....	....	....	....	77	1040	716	151	25	76
29	22	....	....	....	....	....	82	1010	470	122	16	76
30	20	....	....	....	....	....	91	828	369	118	20	76
31	16	....	....	....	....	....	....	892	....	82	27	....
1923-1924												
1	89	....	....	....	....	....	....	151	982	250	48	8
2	93	....	....	....	....	....	....	171	1110	231	39	10
3	104	....	....	....	....	....	....	182	1110	203	28	9
4	125	....	....	....	....	....	....	345	1280	167	16	8
5	118	....	....	....	....	....	....	418	1320	159	12	9
6	111	....	....	....	....	....	....	393	1370	163	22	8
7	104	....	....	....	....	....	....	381	1500	171	27	6
8	96	....	....	....	....	....	....	393	1500	240	15	3
9	79	....	....	....	....	....	....	345	1280	190	7	4
10	73	....	....	....	....	....	....	323	1200	122	6	7
11	82	....	....	....	....	....	....	393	1240	114	8	23
12	93	....	....	....	....	....	....	556	1460	93	8	34
13	82	....	....	....	....	....	....	684	1640	73	12	30
14	67	....	....	....	....	....	....	796	1860	52	18	18
15	70	....	....	....	....	....	280	812	2040	34	22	12
16	73	....	....	....	....	....	226	884	1910	25	22	9
17	....	....	....	....	....	....	212	1070	1640	32	10	8
18	....	....	....	....	....	....	190	1190	1460	48	8	15
19	....	....	....	....	....	....	148	1240	1320	16	9	23
20	....	....	....	....	....	....	144	1150	1070	1	10	23
21	....	....	....	....	....	....	159	1150	796	25	12	18
22	....	....	....	....	....	....	190	1150	716	52	10	15
23	....	....	....	....	....	....	240	1280	660	50	9	16
24	....	....	....	....	....	....	275	1110	604	52	8	13
25	....	....	....	....	....	....	226	1110	596	48	7	13
26	....	....	....	....	....	....	222	1240	526	50	7	13
27	....	....	....	....	....	....	178	1370	470	50	6	13
28	....	....	....	....	....	....	175	1150	418	50	8	15
29	....	....	....	....	....	....	155	1070	363	58	8	21
30	....	....	....	....	....	....	144	946	301	55	8	23
31	....	....	....	....	....	....	....	924	....	52	9	....

[fol. 2040]

Monthly Discharge of Pioneer Canal near Woods, for the Years Ending September 30, 1923 and 1924

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
1922–1923				
October	.....	.....	13	799
November	.....	.....	13	774
December	.....	.....	22.3	1,370
January	.....	.....	25	1,540
February	.....	.....	25	1,390
March	.....	.....	25	1,540
April	35	21	29.7	1,770
May	349	36	126	7,750
June	644	319	408	24,300
July	319	78	122	7,500
August	86	68	79.2	4,870
September	68	10	32.0	1,900
The year	644	10	76.6	55,500
1923–1924				
October	19	12	14.8	910
May	27	12	15.8	972
June	153	37	92.6	5,510
July	154	43	111	6,820
August	64	30	45.4	2,790
September	34	28	30.2	1,800

Note.—Monthly means from October, 1922, to March, 1923, based on company's statement of diversions. During winter of 1923–1924 no water diverted except leakage of a few second-feet.

[fol. 2041]

Daily Discharge, in Second-Feet, of Pioneer Canal near Woods, for the Years Ending September 30, 1923 and 1924

Day 1922–1923	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	.....	.....	13	.....	.....	.....	30	36	351	319	77	68
2	.....	.....	13	.....	.....	.....	30	37	351	250	78	68
3	.....	.....	13	.....	.....	.....	30	39	349	114	78	68
4	.....	.....	13	.....	.....	.....	30	39	351	108	78	68
5	.....	.....	13	.....	.....	.....	30	38	345	113	79	66
6	.....	.....	13	.....	.....	.....	30	39	340	122	85	65
7	.....	.....	13	.....	.....	.....	30	39	338	121	86	64
8	.....	.....	25	.....	.....	.....	30	45	338	122	84	62
9	.....	.....	25	.....	.....	.....	30	55	327	131	83	61
10	.....	13	25	.....	.....	.....	27	55	412	127	83	59
11	.....	.....	25	.....	.....	.....	20	54	394	119	84	53
12	.....	.....	25	.....	.....	.....	21	49	377	116	84	25
13	.....	.....	25	.....	.....	.....	22	47	378	115	84	36
14	.....	.....	25	.....	.....	.....	23	46	364	114	84	12
15	.....	.....	25	.....	.....	.....	24	50	354	120	84	12
16	.....	.....	25	.....	.....	.....	25	60	353	120	84	11
17	.....	.....	25	.....	.....	.....	29	60	343	111	85	11
18	.....	.....	25	.....	.....	.....	34	62	329	101	83	11
19	.....	.....	25	.....	.....	.....	35	66	466	113	83	11

Daily Discharge, in Second-Feet, of Pioneer Canal near Woods, for the Years Ending September 30, 1923 and 1924—Continued

Day 1922–1923	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
20	....	....	25	....	....	....	34	65	635	114	81	11
21	....	....	25	....	....	....	34	61	644	113	80	12
22	....	....	25	....	....	....	34	81	644	109	78	12
23	....	....	25	....	....	....	34	164	626	104	76	13
24	....	....	25	....	....	....	31	248	617	103	76	13
25	....	....	25	....	....	....	31	302	500	103	75	12
26	....	....	25	....	....	....	31	349	351	103	74	12
27	....	....	25	....	....	....	32	345	356	104	71	13
28	....	....	25	....	....	....	33	345	346	105	70	11
29	....	....	25	....	....	....	33	341	329	104	70	11
30	....	....	25	....	....	....	34	343	319	93	68	10
31	....	....	25	....	....	....	....	343	....	78	69	....
1923–1924												
1	16	....	....	....	....	....	....	12	37	150	47	31
2	15	....	....	....	....	....	....	12	42	150	47	30
3	14	....	....	....	....	....	....	13	40	150	47	33
4	15	....	....	....	....	....	....	13	42	149	52	34
5	15	....	....	....	....	....	....	13	52	150	64	31
6	15	....	....	....	....	....	....	14	81	150	61	30
7	15	....	....	....	....	....	....	14	82	154	54	31
8	15	....	....	....	....	....	....	15	80	154	52	32
9	14	....	....	....	....	....	....	14	79	153	53	31
10	14	....	....	....	....	....	....	14	76	149	54	32
11	14	....	....	....	....	....	....	14	77	144	53	32
12	14	....	....	....	....	....	....	15	85	143	53	31
13	14	....	....	....	....	....	....	16	84	143	51	31
14	14	....	....	....	....	....	....	16	89	142	48	30
15	13	....	....	....	....	....	....	16	92	142	49	28
16	13	....	....	....	....	....	....	17	93	142	48	28
17	13	....	....	....	....	....	....	16	85	143	48	28
18	13	....	....	....	....	....	....	17	79	144	48	29
19	12	....	....	....	....	....	....	17	77	142	48	30
20	12	....	....	....	....	....	....	17	96	136	37	31
21	12	....	....	....	....	....	....	17	133	71	40	30
22	12	....	....	....	....	....	....	17	132	43	40	29
23	14	....	....	....	....	....	....	16	132	44	39	28
24	19	....	....	....	....	....	....	16	128	46	38	29
25	18	....	....	....	....	....	....	16	128	46	39	29
26	18	....	....	....	....	....	....	17	126	45	39	30
27	17	....	....	....	....	....	....	17	122	45	36	30
28	17	....	....	....	....	....	....	17	122	45	32	29
29	18	....	....	....	....	....	....	17	133	45	30	30
30	17	....	....	....	....	....	....	18	153	46	30	30
31	17	....	....	....	....	....	....	27	....	47	30	....

Note.—No gage-height record, April 1-10, October 16-19, 30-31, 1923, May 1-6, 19-21, July 15-17, August 18-19, 27, 1924; discharge interpolated.

fol. 2042-2046]

Combined Monthly Discharge of Laramie River and Pioneer Canal near Woods for the Years Ending September 30, 1923 and 1924

Month	Discharge in second-feet			Run-off in acre-feet
1922-1923	Maximum	Minimum	Mean	
October	.....	.....	27 6	1,700
November	.....	.....	30	1,790
December	.....	.....	30	1,840
January	.....	.....	30	1,840
February	.....	.....	30	1,670
March	.....	.....	30	1,840
April	.....	.....	85	5,060
May	1,380	130	524	32,200
June	4,420	688	1,730	103,000
July	847	160	437	26,900
August	191	86	137	8,420
September	129	54	80 8	4,810
The year	4,420	.....	266	191,000
1923-24				
October	140	.....	100	6,150
April 15-30	285	149	203	6,440
May	1,390	163	802	49,300
June	2,130	454	1,220	72,600
July	400	94	206	12,700
August	95	38	59 6	3,660
September	65	35	44 6	2,650

[fol. 2047] Little Laramie River Near Filmore

Location.—In Sec. 9, T. 15 N., R. 77 W., at private bridge at May's ranch, 1½ miles south of Filmore, Albany County. No tributary of importance between station and junction of North, Middle and South forks, 4 miles above.

Drainage area.—155 square miles.

Records available.—July 5, 1902, to August 15, 1903; May 14, 1911, to October 31, 1912; April 1, 1915, to September 30, 1924. State engineer maintained station at this point during 1913 and 1914.

Gage.—Vertical staff at downstream end of left bridge abutment; read by Claude May. Gage used since April 1, 1915, referred to datum 0.21 foot lower than gage at same location used during 1911 and 1912.

Diversions.—Adjudicated diversions for irrigation of 2,000 acres from Little Laramie River and tributaries above station.

Accuracy.—Gage read twice daily; rating curves fairly well defined. Records good.

Monthly Discharge of Little Laramie River near Filmore, for the Years Ending September 30, 1923 and 1924

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
1922–1923				
October	26	14	19.1	1,170
November 1–4	21	19	20.0	159
April 15–30	72	43	54.1	1,720
May	792	68	222	13,600
June	1,100	275	729	43,400
July	310	118	192	11,800
August	126	40	64.3	3,950
September	56	38	42.6	2,530
1923–24				
October	91	45	58.2	3,580
November 1–14	58	42	47.9	1,310
April	275	62	136	8,090
May	832	74	377	23,200
June	1,560	84	686	40,800
July	116	71	81.0	4,980
August	71	34	44.1	2,710
September	45	34	36.1	2,150

[fol. 2048–2152]

Daily Discharge, in Second-Feet, of Little Laramie River near Filmore, for the Years Ending September 30, 1923 and 1924

Day 1922–1923	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	26	20	....	....	....	....	....	68	700	220	126	41
2	17	20	....	....	....	....	....	73	760	208	107	41
3	14	21	....	....	....	....	....	70	890	220	85	40
4	17	19	....	....	....	....	....	72	960	220	94	40
5	20	....	....	....	....	....	....	72	1030	232	93	41
6	20	....	....	....	....	....	....	80	670	232	90	40
7	20	....	....	....	....	....	....	80	640	245	82	39
8	14	....	....	....	....	....	....	72	825	220	76	40
9	17	....	....	....	....	....	....	93	1100	220	73	38
10	17	....	....	....	....	....	....	109	1100	260	63	42
11	20	....	....	....	....	....	....	136	1030	310	63	43
12	20	....	....	....	....	....	....	116	960	310	62	40
13	17	....	....	....	....	....	....	126	960	292	62	40
14	17	....	....	....	....	....	....	96	890	260	58	41
15	20	....	....	....	....	....	48	96	1030	182	53	41
16	17	....	....	....	....	....	43	104	1030	136	63	42
17	19	....	....	....	....	....	44	122	825	147	59	44
18	20	....	....	....	....	....	58	96	760	147	63	44
19	19	....	....	....	....	....	48	113	700	147	53	44
20	18	....	....	....	....	....	47	136	670	126	48	42
21	19	....	....	....	....	....	45	170	612	136	51	41
22	20	....	....	....	....	....	48	195	612	170	66	45
23	18	....	....	....	....	....	48	245	558	220	49	45
24	18	....	....	....	....	....	49	275	480	158	44	38
25	20	....	....	....	....	....	55	260	480	147	44	45
26	20	....	....	....	....	....	71	412	390	136	45	46
27	20	....	....	....	....	....	63	530	370	147	45	51
28	20	....	....	....	....	....	60	612	292	126	45	42
29	23	....	....	....	....	....	72	700	275	124	45	46
30	25	....	....	....	....	....	67	792	275	126	45	56
31	21	....	....	....	....	....	....	760	....	118	40	....

Daily Discharge, in Second-Feet, of Little Laramie River near Filmore, for Years Ending September 30, 1923 and 1924—Continued

Day 1923-1924	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	55	47	....	....	....	....	198	74	414	88	71	34
2	63	52	....	....	....	....	175	96	369	91	71	34
3	62	47	....	....	....	....	175	88	410	82	68	34
4	69	58	....	....	....	....	221	104	616	91	63	34
5	91	52	....	....	....	....	198	122	957	84	63	34
6	75	45	....	....	....	....	275	120	1170	80	52	34
7	81	47	....	....	....	....	246	120	1240	76	47	34
8	75	43	....	....	....	....	275	122	960	84	42	34
9	63	43	....	....	....	....	146	122	700	84	42	34
10	61	45	....	....	....	....	153	113	700	82	42	44
11	63	47	....	....	....	....	113	132	960	116	42	45
12	58	47	....	....	....	....	142	153	960	91	42	40
13	60	42	....	....	....	....	153	182	1400	76	42	34
14	63	43	....	....	....	....	142	198	1560	84	42	34
15	60	....	....	....	....	....	175	226	1400	91	42	34
16	63	....	....	....	....	....	153	275	1240	91	42	34
17	52	....	....	....	....	....	62	325	1030	76	42	34
18	47	....	....	....	....	....	62	566	890	76	40	40
19	52	....	....	....	....	....	68	638	792	76	39	45
20	47	....	....	....	....	....	64	582	480	91	39	34
21	52	....	....	....	....	....	67	638	412	76	39	34
22	47	....	....	....	....	....	81	692	480	73	37	34
23	47	....	....	....	....	....	99	692	370	71	37	35
24	47	....	....	....	....	....	108	692	232	76	37	34
25	47	....	....	....	....	....	88	774	208	71	37	34
26	52	....	....	....	....	....	104	832	195	71	37	34
27	52	....	....	....	....	....	88	832	147	71	34	34
28	63	....	....	....	....	....	74	676	116	71	34	38
29	45	....	....	....	....	....	88	460	99	76	34	40
30	45	....	....	....	....	153	74	566	84	73	34	42
31	47	....	....	....	....	175	....	485	....	72	34	....

[fol. 2153]

Comp. Exhibit 45

Laramie River Near Jelm

Location.—In sec. 15, T. 12 N., R. 77 W., just below highway bridge at Boswell's ranch, a quarter of a mile below Colorado-Wyoming line, 4 miles south of old Jelm, Albany County. Stuck Creek enters 1 mile upstream.

Drainage area.—297 square miles.

Records available.—May 7, 1911, to September 30, 1926. From June 22, 1904, to October 31, 1905, station maintained at Decker's ranch half a mile south of state line.

Gage.—Bristol float-type water-stage recorder on right bank 30 feet downstream from bridge; inspected by R. A. Mosier.

Accuracy.—Gage heights from continuous record except as explained in footnote to daily-discharge table; rating curves well defined. Records excellent except for periods of missing gage heights for which they are fair.

Monthly Discharge of Laramie River Near Jelm, for the Years Ending September 30, 1925 and 1926

Month	Discharge in second-feet			Run-off in Acre-feet
	Maximum	Minimum	Mean	
1924–1925				
October 1–7	63	60	60.9	846
May	528	172	336	20,700
June	656	214	397	23,600
July	261	90	152	9,350
August	208	84	118	7,260
September	161	70	95.3	5,670
1925–1926				
October	265	56	105	6,460
November 1–12	120	82	100	2,380
April	295	.....	168	10,000
May	1,990	335	843	51,800
June	1,470	340	830	49,400
July	622	150	293	18,000
August	137	56	96.6	5,940
September	95	42	57.3	3,410

[fols. 2154–2158]

Daily Discharge, in Second-Feet, of Laramie River near Jelm, for the Year Ending September 30, 1925 and 1926

Day 1924–1925	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	60	....	....	....	....	....	....	172	528	220	98	86
2	60	....	....	....	....	....	....	195	468	257	92	83
3	61	....	....	....	....	....	....	231	380	238	94	138
4	61	....	....	....	....	....	....	198	355	261	125	161
5	60	....	....	....	....	....	....	211	552	231	136	129
6	61	....	....	....	....	....	....	217	616	204	169	108
7	63	....	....	....	....	....	....	211	656	167	132	94
8	....	....	....	....	....	....	....	265	516	154	127	86
9	....	....	....	....	....	....	....	270	492	141	112	83
10	....	....	....	....	....	....	....	265	456	132	102	81
11	....	....	....	....	....	....	....	250	434	127	189	79
12	....	....	....	....	....	....	....	242	428	158	208	75
13	....	....	....	....	....	....	....	250	375	144	151	81
14	....	....	....	....	....	....	....	257	350	125	129	112
15	....	....	....	....	....	....	....	246	380	123	114	100
16	....	....	....	....	....	....	....	231	395	138	100	86
17	....	....	....	....	....	....	....	275	400	144	90	75
18	....	....	....	....	....	....	....	340	365	132	84	72
19	....	....	....	....	....	....	....	300	370	123	96	102
20	....	....	....	....	....	....	....	360	390	146	146	116
21	....	....	....	....	....	....	....	434	370	198	123	100
22	....	....	....	....	....	....	....	516	400	169	106	90
23	....	....	....	....	....	....	....	462	417	151	96	105
24	....	....	....	....	....	....	....	498	365	129	90	145
25	....	....	....	....	....	....	....	504	282	116	108	100
26	....	....	....	....	....	....	....	510	270	104	121	79
27	....	....	....	....	....	....	....	455	246	98	106	79
28	....	....	....	....	....	....	....	492	224	94	114	73
29	....	....	....	....	....	....	....	528	214	90	118	70
30	....	....	....	....	....	....	151	516	217	94	102	70
31	....	....	....	....	....	....	....	510	....	100	92	....

Daily Discharge, in Second-Feet, of Laramie River near Jelm, for the Years Ending September 30, 1925 and 1926—Continued

Day	1925	1926	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1			63	117	....	....	....	....	75	336	1440	622	137	56
2			61	97	....	....	....	....	75	412	1440	456	129	56
3			58	92	....	....	....	....	75	480	1340	434	132	58
4			56	88	....	....	....	....	75	583	1260	406	134	60
5			72	92	....	....	....	....	75	691	1170	350	129	60
6			265	120	....	....	....	....	110	777	1260	400	129	54
7			164	108	....	....	....	....	110	660	1410	522	134	54
8			132	115	....	....	....	....	110	520	1470	474	129	95
9			115	106	....	....	....	....	110	450	1320	456	132	70
10			106	101	....	....	....	....	110	410	1180	558	127	61
11			115	88	....	....	....	....	160	390	1000	365	120	60
12			132	82	....	....	....	....	160	370	992	295	110	61
13			112	....	....	....	....	....	160	336	948	274	106	63
14			106	....	....	....	....	....	160	335	1080	265	99	60
15			108	....	....	....	....	....	167	440	761	253	95	58
16			103	....	....	....	....	....	204	490	663	238	92	54
17			88	....	....	....	....	....	220	510	609	211	88	54
18			97	....	....	....	....	....	211	500	596	195	84	46
19			95	....	....	....	....	....	208	540	564	189	80	45
20			95	....	....	....	....	....	208	642	546	178	86	42
21			90	....	....	....	....	....	257	917	486	183	78	44
22			99	....	....	....	....	....	224	1040	450	195	78	45
23			106	....	....	....	....	....	231	1210	417	178	72	46
24			106	....	....	....	....	....	183	1470	385	172	68	48
25			97	....	....	....	....	....	175	1550	375	164	65	60
26			99	....	....	....	....	....	189	1580	355	158	65	61
27			99	....	....	....	....	....	220	1790	340	161	63	63
28			95	....	....	....	....	....	224	1990	345	192	61	61
29			110	....	....	....	....	....	250	1690	350	208	60	61
30			101	....	....	....	....	....	295	1520	350	178	58	63
31			110	....	....	....	....	....	....	1490	....	150	56	....

Note.—No gage-height record May 17-20, September 21-25, 1925; April 1-14 May 7-12, 14-19, 1926; discharge based on comparison with records of Laramie River near Glendevey, and North Platte River at Saratoga. Quantities April 1-14, 1926 show mean values.

[fol. 2159] Little Laramie River Near Filmore.

Location.—In sec. 9, T. 15 N., R. 77 W., at private bridge at May's ranch, 1½ miles south of Filmore, Albany County. No tributary of importance between station and junction of North, Middle and South forks, 4 miles above.

Drainage area.—155 square miles.

Records available.—July 5, 1902, to August 15, 1903; May 14, 1911, to September 30, 1926.

Gage.—Vertical staff at downstream end of left bridge abutment; read by Claude May.

Accuracy.—Gage read twice daily; rating curves well defined. Records good.

Monthly Discharge of Little Laramie River Near Filmore, for the Years Ending September 30, 1925 and 1926

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Means	
1925				
April	49	47	47.8	379
May	610	53	264	16,200
June	890	219	388	23,100
July	350	88	150	9,220
August	88	34	57.4	3,530
September	38	25	29.2	1,740
The period	.....	.....	.....	54,200
1926				
April 18–30	168	112	138	3,560
May	1,790	178	502	30,900
June	960	188	494	29,400
July	370	83	162	9,960
August	104	31	65.2	4,010
September	72	26	34.0	2,020
The period	.....	.....	.....	79,800

[fols. 2160–2248]

Daily Discharge, in Second-Feet, of Little Laramie River near Filmore, for the Years Ending September 30, 1925 and 1926

Day 1925	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	....	....	....	....	....	....	....	53	430	198	88	36
2	....	....	....	....	....	....	....	58	410	230	88	36
3	....	....	....	....	....	....	....	63	315	242	82	38
4	....	....	....	....	....	....	....	82	255	350	79	38
5	....	....	....	....	....	....	....	82	890	300	79	36
6	....	....	....	....	....	....	....	85	552	219	82	35
7	....	....	....	....	....	....	....	81	525	198	81	35
8	....	....	....	....	....	....	....	130	525	198	81	32
9	....	....	....	....	....	....	....	136	332	188	74	32
10	....	....	....	....	....	....	....	143	332	198	70	32
11	....	....	....	....	....	....	....	144	300	198	70	32
12	....	....	....	....	....	....	....	148	300	122	70	30
13	....	....	....	....	....	....	....	148	315	122	70	30
14	....	....	....	....	....	....	....	198	350	105	69	30
15	....	....	....	....	....	....	....	213	410	110	69	26
16	....	....	....	....	....	....	....	198	452	122	52	26
17	....	....	....	....	....	....	....	178	452	139	42	26
18	....	....	....	....	....	....	....	198	452	122	42	26
19	....	....	....	....	....	....	....	219	398	105	47	26
20	....	....	....	....	....	....	....	270	410	105	38	25
21	....	....	....	....	....	....	....	370	410	105	38	25
22	....	....	....	....	....	....	....	500	500	105	38	25
23	....	....	....	....	....	....	....	410	490	105	38	25
24	....	....	....	....	....	....	....	452	370	113	38	25
25	....	....	....	....	....	....	....	452	300	105	34	25
26	....	....	....	....	....	....	....	525	255	90	34	25
27	....	....	....	....	....	....	48	410	230	90	34	25
28	....	....	....	....	....	....	47	525	242	88	38	25
29	....	....	....	....	....	....	47	610	219	90	38	25
30	....	....	....	....	....	....	49	580	219	90	38	25
31	....	....	....	....	....	....	....	525	..	90	38	....

Daily Discharge, in Second-Feet, of Little Laramie River near Filmore, for the Years Ending September 30, 1925 and 1926—Continued

Day 1926	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	....	....	....	....	....	....	....	178	760	220	94	29
2	....	....	....	....	....	....	....	178	890	209	86	27
3	....	....	....	....	....	....	....	188	760	198	80	37
4	....	....	....	....	....	....	....	209	890	220	88	44
5	....	....	....	....	....	....	....	285	890	209	77	37
6	....	....	....	....	....	....	....	315	890	285	80	33
7	....	....	....	....	....	....	....	242	960	230	104	31
8	....	....	....	....	....	....	....	300	890	370	83	42
9	....	....	....	....	....	....	....	220	890	255	92	31
10	....	....	....	....	....	....	....	209	730	220	104	31
11	....	....	....	....	....	....	....	209	552	188	83	31
12	....	....	....	....	....	....	....	230	580	168	73	33
13	....	....	....	....	....	....	....	209	525	158	77	72
14	....	....	....	....	....	....	....	188	610	158	64	60
15	....	....	....	....	....	....	....	188	475	148	64	44
16	....	....	....	....	....	....	....	209	410	139	64	40
17	....	....	....	....	....	....	....	198	332	130	56	33
18	....	....	....	....	....	....	148	285	285	130	52	31
19	....	....	....	....	....	....	139	300	285	121	52	33
20	....	....	....	....	....	....	139	525	242	130	60	29
21	....	....	....	....	....	....	130	610	209	130	46	26
22	....	....	....	....	....	....	130	700	209	121	46	28
23	....	....	....	....	....	....	148	730	188	109	49	26
24	....	....	....	....	....	....	139	820	188	104	46	26
25	....	....	....	....	....	....	112	890	198	98	46	26
26	....	....	....	....	....	....	130	1170	188	95	46	26
27	....	....	....	....	....	....	130	1310	188	92	49	26
28	....	....	....	....	....	....	130	1790	198	109	44	27
29	....	....	....	....	....	....	148	960	198	98	44	29
30	....	....	....	....	....	....	168	760	209	92	40	33
31	....	....	....	....	....	....	....	960	....	83	31	....

Note.—No gage-height record May 1-2, 9, September 20-30, 1925; discharge based on comparison with flow of Little Loramie River at Two Rivers. Discharge for September 25, 1925 represents mean value for period.

[fol. 2249]

Comp. Exhibit 46

Laramie River Near Jelm

Location.—In sec. 15, T. 12 N., R. 77 W., just below highway bridge at Boswell's ranch, a quarter of a mile below the Colorado-Wyoming line, 4 miles south of old Jelm, Albany County. Stuck Creek enters 1 mile upstream.

Drainage Area.—297 square miles.

Records Available.—May 7, 1911, to September 30, 1928. From June 22, 1904, to October 31, 1905, station maintained at Decker's ranch half a mile south of state line.

Gage.—Bristol float-type water-stage recorder on right bank 30 feet downstream from bridge; inspected by R. A. Mosier.

Accuracy.—Gage heights from continuous records. Rating curves well defined. Records good.

Monthly Discharge of Laramie River Near Jelm, for the Years Ending September 30, 1927 and 1928

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
1926–1927				
October	95	51	65.0	4,000
November	84	35	50.3	2,990
April	154	50	73.8	4,390
May	1,010	167	516	31,700
June	970	476	658	39,200
July	366	128	214	13,200
August	151	59	104	6,400
September	134	38	61.7	3,670
1927–1928				
October	97	60	75.5	4,640
April	172	58	89.0	5,300
May	2,070	210	844	51,900
June	1,980	546	880	52,400
July	552	154	297	18,300
August	145	50	86.0	5,290
September	73	40	50.7	3,020

[fols. 2250–2392]

Daily Discharge, in Second-Feet, of Laramie River near Jelm, for the Years Ending September 30, 1927 and 1928

Day 1926–1927	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	65	63	....	....	....	....	50	167	586	366	146	54
2	68	54	....	....	....	....	50	208	586	318	134	53
3	72	61	....	....	....	....	50	219	599	300	140	56
4	72	63	....	....	....	....	50	215	580	300	126	58
5	70	84	....	....	....	....	50	212	627	322	126	59
6	76	58	....	....	....	....	60	200	661	270	121	59
7	78	58	....	....	....	....	70	258	706	234	128	54
8	76	51	....	....	....	....	82	346	796	223	126	50
9	82	50	....	....	....	....	69	262	867	238	151	52
10	95	84	....	....	....	....	69	250	840	313	121	54
11	84	61	....	....	....	....	69	258	858	242	116	49
12	74	54	....	....	....	....	65	270	912	200	114	41
13	63	53	....	....	....	....	59	283	752	183	116	44
14	61	54	....	....	....	....	56	360	698	173	106	54
15	63	56	....	....	....	....	53	427	970	160	111	50
16	61	51	....	....	....	....	54	566	737	151	118	42
17	58	40	....	....	....	....	55	822	661	143	95	40
18	58	40	....	....	....	....	56	990	737	131	84	38
19	56	38	....	....	....	....	58	805	737	128	80	38
20	56	35	....	....	....	....	60	849	683	134	88	40
21	60	40	....	....	....	....	61	921	627	180	95	40
22	58	40	....	....	....	....	62	1010	547	193	84	42
23	56	40	....	....	....	....	69	858	476	170	106	76
24	58	40	....	....	....	....	67	661	495	170	93	74
25	51	40	....	....	....	....	78	627	521	140	71	116
26	53	40	....	....	....	....	104	675	482	134	76	134
27	53	40	....	....	....	....	131	668	502	163	88	108
28	56	40	....	....	....	....	154	706	514	262	74	104
29	58	40	....	....	....	....	148	706	508	270	71	88
30	51	40	....	....	....	....	154	606	476	234	64	84
31	74	....	....	....	....	....	....	593	....	176	59	....

Daily Discharge, in Second-Feet, of Laramie River near Jelm, for the Years Ending September 30, 1927 and 1928—Continued

Day 1927-1928	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	91	....	....	....	....	....	90	210	1980	552	137	66
2	88	....	....	....	....	....	88	315	1800	528	137	73
3	80	....	....	....	....	....	85	305	1870	462	145	64
4	84	....	....	....	....	....	77	254	1420	434	137	59
5	97	....	....	....	....	....	71	241	1180	428	132	55
6	97	....	....	....	....	....	58	233	1010	412	124	51
7	93	....	....	....	....	....	59	290	976	390	119	49
8	84	....	....	....	....	....	79	395	986	346	107	50
9	78	....	....	....	....	....	81	596	898	320	95	50
10	76	....	....	....	....	....	83	705	889	300	93	50
11	71	....	....	....	....	....	71	691	946	305	93	55
12	62	....	....	....	....	....	70	635	810	281	91	58
13	64	....	....	....	....	....	68	670	737	272	87	51
14	67	....	....	....	....	....	70	635	713	300	85	49
15	78	....	....	....	....	....	73	602	635	290	81	51
16	78	....	....	....	....	....	73	576	691	258	77	51
17	76	....	....	....	....	....	83	546	810	320	77	48
18	74	....	....	....	....	....	85	583	836	258	75	43
19	71	....	....	....	....	....	75	602	691	241	70	42
20	69	....	....	....	....	....	73	649	596	229	64	43
21	65	....	....	....	....	....	81	729	546	214	61	54
22	67	....	....	....	....	....	77	908	583	218	59	54
23	67	....	....	....	....	....	81	1140	590	233	59	49
24	62	....	....	....	....	....	93	1270	564	263	59	45
25	64	....	....	....	....	....	104	1440	596	222	59	44
26	62	....	....	....	....	....	104	1590	622	196	61	43
27	60	....	....	....	....	....	119	1640	596	186	63	40
28	65	....	....	....	....	....	154	1800	616	210	63	41
29	86	....	....	....	....	....	172	1890	609	199	55	46
30	82	....	....	....	....	....	172	1960	590	172	50	46
31	84	....	....	....	....	....	....	2070	....	154	52	....

Note.—Stage-discharge relation affected by ice November 18-30, 1926; no gage height record April 1-7, 16-21, 1927, April 1-2, 9, 1928; discharge based on temperature record.

[fol. 2393]

Comp. Exhibit 47

Laramie River Near Jelm

Location.—In sec. 15, T. 12 N., R. 77 W., just below highway bridge at Boswell's ranch, a quarter of a mile below the Colorado-Wyoming line, 4 miles south of old Jelm, Albany County. Stuck Creek enters 1 mile upstream.

Drainage Area.—297 square miles.

Records Available.—May 7, 1911, to September 30, 1930. From June 22, 1904, to October 31, 1905, station maintained at Decker's ranch half a mile south of state line.

Gage.—Bristol float-type water-stage recorder on right bank 30 feet downstream from bridge; inspected by R. A. Mosier.

Accuracy.—Records good.

Monthly Discharge of Laramie River Near Jelm for the Years Ending September 30, 1929 and 1930

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
1928–1929				
October	75	43	57	3,500
November	50	35	49.7	2,960
April 23–30	186	94	124	1,970
May	1,140	110	425	26,100
June	1,780	852	1,260	75,000
July	892	163	339	20,800
August	242	57	111	6,820
September	157	52	97.1	5,780
1929–1930				
October	107	40	66.4	4,080
April	416	.....	192	11,400
May	1,040	186	416	25,600
June	1,020	140	449	26,700
July	361	73	120	7,380
August	378	68	136	8,360
September	103	36	61.2	3,640

[fols. 2394–2477]

Daily Discharge, in Second-Feet, of Laramie River near Jelm, for the Years Ending September 30, 1929 and 1930

Day 1928–1929	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	45	51	....	....	....	....	....	144	995	892	242	82
2	45	54	....	....	....	....	....	121	1280	723	216	81
3	44	50	....	....	....	....	....	126	1270	639	176	87
4	44	50	....	....	....	....	....	126	1320	591	163	87
5	49	50	....	....	....	....	....	116	1390	546	173	92
6	54	50	....	....	....	....	....	110	1480	504	213	144
7	54	50	....	....	....	....	....	132	1480	404	227	157
8	54	50	....	....	....	....	....	166	1620	388	163	157
9	52	50	....	....	....	....	....	206	1720	350	141	132
10	50	50	....	....	....	....	....	220	1780	310	132	129
11	45	50	....	....	....	....	....	166	1760	294	126	135
12	43	52	....	....	....	....	....	138	1590	294	110	124
13	46	54	....	....	....	....	....	182	1450	298	92	148
14	49	51	....	....	....	....	....	250	1410	289	84	135
15	63	54	....	....	....	....	....	310	1500	306	75	121
16	63	58	....	....	....	....	....	306	1270	319	70	107
17	58	58	....	....	....	....	....	324	1450	277	82	102
18	73	64	....	....	....	....	....	350	1170	306	90	90
19	71	70	....	....	....	....	....	341	963	246	84	80
20	75	65	....	....	....	....	....	364	995	250	73	77
21	75	65	....	....	....	....	....	471	1020	227	68	77
22	64	70	....	....	....	....	....	576	1130	202	68	77
23	55	73	....	....	....	....	121	757	1180	220	64	84
24	55	77	....	....	....	....	116	912	1010	261	59	107
25	56	85	....	....	....	....	100	1100	974	206	70	77
26	63	77	....	....	....	....	94	1140	963	186	62	70
27	66	71	....	....	....	....	97	882	963	189	57	62
28	63	79	....	....	....	....	110	933	953	186	66	59
29	68	63	....	....	....	....	166	757	923	163	68	57
30	63	68	....	....	....	....	186	639	852	199	62	64
31	61	....	....	....	....	....	....	814	....	235	57	....

Daily Discharge, in Second-Feet, of Laramie River near Jelm, for the Years Ending September 30, 1929 and 1930—Continued

Day												
1928	1929	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1		59	....	....	....	....	....	45	356	1020	131	108	65
2		57	....	....	....	....	....	45	440	696	128	100	59
3		100	....	....	....	....	....	45	483	556	108	95	57
4		107	....	....	....	....	....	45	378	522	98	201	57
5		77	....	....	....	....	....	45	372	470	93	137	63
6		64	....	....	....	....	....	60	299	464	93	117	69
7		59	....	....	....	....	....	75	268	549	91	169	82
8		100	....	....	....	....	....	100	235	612	84	176	80
9		100	....	....	....	....	....	159	219	658	73	155	73
10		87	....	....	....	....	....	172	216	612	77	143	61
11		94	....	....	....	....	....	193	204	598	152	134	53
12		80	....	....	....	....	....	216	186	658	190	172	48
13		59	....	....	....	....	....	212	197	642	361	247	43
14		55	....	....	....	....	....	231	197	549	216	361	40
15		57	....	....	....	....	....	247	239	422	131	378	37
16		55	....	....	....	....	....	227	243	372	98	201	38
17		54	....	....	....	....	....	172	272	405	88	149	40
18		55	....	....	....	....	....	159	239	399	128	120	40
19		59	....	....	....	....	....	152	281	346	114	95	36
20		57	....	....	....	....	....	131	337	327	117	80	37
21		54	....	....	....	....	....	140	476	378	117	75	37
22		55	....	....	....	....	....	169	628	405	108	75	42
23		49	....	....	....	....	....	216	446	410	88	73	55
24		40	....	....	....	....	....	290	416	268	88	73	62
25		44	....	....	....	....	....	416	464	243	106	73	75
26		64	....	....	....	....	....	388	522	235	95	73	90
27		73	....	....	....	....	....	388	680	201	91	95	95
28		66	....	....	....	....	....	356	752	169	86	95	103
29		59	....	....	....	....	....	337	870	155	122	93	100
30		52	....	....	....	....	....	346	950	140	134	84	100
31		66	....	....	....	....	....	....	1040	....	117	69	....

[fol. 2478]

Comp. Exhibit 48

Laramie River Near Jelm

Location—In sec. 15, T. 12 N., R. 77 W., at Boswell's ranch, a quarter of a mile below the Colorado-Wyoming line, 4 miles south of old Jelm.

Drainage Area—297 square miles.

Records Available—May 7, 1911, to September 30, 1932. From June 22, 1904, to October 31, 1905, station maintained at Decker's ranch half a mile south of state line.

Gage—Au fuzee water-stage recorder on right bank 30 feet downstream from bridge; inspected by R. W. Mosier.

Accuracy—Records excellent except during winter period, for which they are fair.

Monthly Discharge of Laramie River Near Jelm for the Years Ending September 30, 1931 and 1932

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
1931				
October	108	54	77.5	4,770
November	58	.....	46.6	2,770
December	.....	.....	32	1,970
January	.....	.....	30	1,840
February	.....	.....	35	1,940
March	.....	.....	39.5	2,430
April	565	62	171	10,200
May	595	108	304	18,700
June	630	133	384	22,800
July	163	42	66.5	4,090
August	75	28	42.5	2,610
September	92	21	33.3	1,980
The year	630	.....	105	76,100
1932				
October	68	39	54.3	3,340
November	58	.....	47.2	2,810
December	.....	.....	35.0	2,150
January	.....	.....	30	1,840
February	.....	.....	30	1,730
March	.....	.....	40	2,460
April	163	.....	92.6	5,510
May	2,310	90	704	43,300
June	990	480	757	45,000
July	456	68	158	9,720
August	86	42	56.7	3,490
September	54	23	32.2	1,920
The year	2,310	.....	170	123,000

Laramie River and Pioneer Canal Near Woods

Location—In sec. 36, T. 14 N., R. 77 W., at diversion dam of Pioneer Canal, 2 miles from Woods.

Drainage Area—409 square miles.

Records Available—April 16, 1912, to September 30, 1924; April 19 to September 30, 1927; April 11 to September 30, 1932.

Gage—Stevens water-stage recorder at diversion dam; staff gage in canal 1½ miles below intake; read by Wesley Johnson.

Accuracy—Records good.

[fols. 2479-2499]

Monthly Discharge of Laramie River Near Woods for the Period Ending September 30, 1932

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
April 11-30	240	111	185	7,340
May	1,730	159	838	51,500
June	940	334	714	42,500
July	438	2	117	7,190
August	41	0	9.6	590
September	9	0	1.6	95
The period	.....	.....	.....	109,000

Monthly Discharge of Pioneer Canal Near Woods for the Period Ending September 30, 1932

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
April 11-30	5	5	5.0	198
May	146	5	32.9	2,020
June	495	64	153	9,100
July	76	52	66.8	4,110
August	92	39	56.5	3,470
September	40	14	27.0	1,610
The period	.....	.....	.....	20,500

Combined Monthly Discharge of Laramie River and Pioneer Canal Near Woods for the Period Ending September 30, 1932

Month	Discharge in second-feet			Run-off in acre-feet
	Maximum	Minimum	Mean	
April 11-30	245	116	190	7,540
May	1,780	164	871	53,600
June	1,070	567	867	51,600
July	509	77	184	11,300
August	133	42	66.1	4,060
September	49	16	28.7	1,710
The period	.....	.....	.....	130,000

COMP. EXH. No. 49

Laramie River at Jelm, Wyoming

Monthly and Yearly Discharge in Acre-Feet

Interstate Gaging Station at Colorado-Wyoming Line

Compiled from Published Records of U. S. Geological Survey, Water Supply Paper 469, from Published Records of the State of Colorado, Biennial Reports of State Engineer, and from Published Records of the State of Wyoming, Biennial Reports of State Engineer

R. I. Meeker, Irrigation Engineer

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1905	1840	1390	1350	2980	28200	69000	13000	6010	2360	E 3000	E 2800	E 2500	134,000
1911	E 2300	E 2100	E 2700	E 5000	*35000	47100	13700	4390	2560	4180	3710	2770	126,000
12	2460	2590	2770	3570	31800	89900	33600	7380	4860	5120	3290	2150	189,000
13	2460	1940	3070	10400	31700	26200	8300	3400	3090	4390	3330	2770	101,000
14	2460	2220	3070	6840	58800	79700	14400	6640	2220	4400	2680	1720	185,000
15	1350	1560	1840	7140	18700	28400	7930	4490	3770	4230	2980	2770	85,100
16	2950	2760	4000	6900	32500	45300	9470	6000	4900	5530	4760	4000	129,000
17	3200	2780	2460	5950	28900	119000	53900	10600	4820	2740	2380	2150	239,000
18	2150	1940	2770	5180	35700	69600	14900	5580	3630	3070	2680	2770	150,000
19	2770	2500	3070	7140	26100	16800	5640	3380	2250	2620	2080	1840	76,200
20	1840	1440	1840	2980	36300	82700	17500	9100	4520	3670	1790	2460	166,000
21	2460	2220	3070	5060	35900	83900	19300	7560	3710	3010	E 2700	E 2500	171,000
22	E 2300	E 2100	E 2600	*5000	20600	29700	7440	4220	2200	1920	E 1800	E 1700	81,600
23	E 1700	E 1600	E 2200	*6000	27700	88100	24300	6210	3860	4730	4520	E 4000	175,000
24	E 3000	E 2700	E 3000	*4700	31700	58800	11600	3970	3570	E 3900	E 3000	E 2700	133,000
25	E 2500	E 2300	E 2800	E 5000	20700	23600	9350	7260	5670	6460	*3500	E 2800	91,900
26	E 2600	E 2400	E 3500	10000	51800	49400	18000	5940	3410	4000	2990	E 2500	156,000
27	E 2300	E 2000	E 2500	4390	31700	39200	13200	6400	3670	4640	E 3500	E 3000	116,000
28	E 2700	E 2500	E 3000	5300	51900	52400	18300	5290	3020	3500	2960	E 2500	153,000
29	E 2300	E 2100	E 2600	*5000	26100	75000	20800	6820	5780	4080	E 3000	E 2800	156,000
30	E 2200	E 2000	E 3000	11400	25600	26700	7380	8360	3640	4770	2770	1970	99,800
31	1840	1940	2430	10200	18700	22800	4090	2610	1980	3340	2810	2150	74,900
32	1840	1730	2460	5510	43300	45000	9720	3490	1920	E 2200	E 2000	E 1800	121,000

*Fractional Record extended.
E—Estimated from related records.
Drainage Area, 297 square miles. Elevation, 7730 feet above sea level.

Total of all years 3,110,000
23-year Mean, 1905, 1911–1932 135,000

[fol. 2501]

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COMP. EXH. No. 50

Laramie River Near Woods, Wyoming

Monthly and Yearly Discharges in Acre-Feet

Combined Flow of Laramie River at Pioneer Dam and Pioneer Canal Diversions

Compiled from Published Records of U. S. Geological Survey and State of Wyoming

R. I. Meeker, Irrigation Engineer

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1912	A 2700	A 2800	A 3000	A 4000	39900	94000	34400	7850	4760	6400	4160	2310	206,000
13	2650	2350	3300	12700	38300	26600	6820	3130	3020	3800	3680	3250	110,000
14	2840	2619	3360	7740	64400	79200	13700	4050	2170	4420	2990	1860	189,000
15	1520	1810	2180	7860	20400	32100	8610	3970	3750	4000	3060	2980	92,200
16	3300	3160	4560	8870	42500	47700	13800	7690	5660	6460	5160	4360	153,000
17	3650	3030	2790	7500	37900	141000	54900	11200	4150	A 3000	A 2700	A 2400	274,000
18	A 2300	A 2200	A 3100	6310	52300	82700	15100	4800	4330	A 3400	A 3000	A 2900	182,000
19	A 2900	A 2700	A 3500	7970	28500	17400	4670	3520	2280	A 3000	A 2500	A 2100	81,000
20	A 2000	A 1700	A 2200	A 5000	66400	94000	20200	8480	4640	3940	4620	2950	216,000
21	2770	2500	3690	6010	54200	94600	19200	9470	3340	3810	3060	*2000	205,000
22	E 2500	E 2400	*3500	7860	30100	39100	7010	3980	2080	1700	1790	1840	103,000
23	1840	1670	1840	5060	32200	103000	26900	8420	4810	6150	A 4800	A 4200	201,000
24	E 3200	E 3000	E 3600	*9000	49300	72600	12700	3660	2650	E 4300	E 3400	E 3000	170,000
1932	A 2100	A 2200	A 3000	*9000	53600	51600	11300	4060	1710	E 2400	E 2200	E 2000	145,000
14-year Mean, 1912-24, 1932													2,328,200
													166,000

*Fractional Record extended.
E—Estimated from related records.
A—Derived from records at Jelm Wyoming Station.
Drainage Area, 409 square miles. Elevation, 7390 feet above sea level.

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[fol. 2502]

COMP. EXH. No. 51

Little Laramie River near Filmore, Wyoming

Monthly and Yearly Discharge in Acre-Feet

Compiled from Published Records of U. S. Geological Survey, Water Supply Paper No. 469; Compiled from Published Records of the State of Wyoming; Biennial Reports of State Engineer

R. I. Meeker, Irrigation Engineer

Drainage Area 155 Sq. Miles. Altitude — Feet Above Sea Level

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1903	1540	1390	1840	6840	13600	72600	12700	4000	2980	E 3100	E 2200	E 1800	125000
1911	E 1300	E 1100	E 1500	E 3000	*15000	31500	7870	2420	1120	2330	1490	1540	70000
1912	1230	1150	1540	2500	13500	54300	23200	7750	4440	4750	2980	2460	120000
1913	2150	1940	2460	3810	20700	22300	6760	2150	524	1130	1190	922	66000
1914	922	833	1540	4760	23100	41200	10000	3380	1570	1750	2080	1840	93000
1915	1540	1390	1720	3320	12300	18900	4350	2530	2200	2770	2080	1840	54900
1916	1540	1440	1540	5620	12900	24100	7010	3500	1120	1730	1190	1110	62800
1917	1110	833	1110	3690	11700	67200	35200	5920	2310	1920	2240	1540	135000
1918	1540	1110	2460	3080	13600	61300	13000	3620	2550	2340	1790	1540	108000
1919	1230	1110	1540	3000	18800	11100	3240	1630	565	1100	595	922	44800
1920	922	863	1230	3020	17200	55300	11200	5350	2600	2330	2390	1540	104000
1921	1230	1110	*2100	2740	17600	56000	11900	4900	1760	1640	1460	E 1200	104000
1922	E 1100	E 1000	E 1700	2760	13000	29200	5420	2480	E 1700	1170	E 1000	E 900	61400
1923	E 900	E 800	E 1600	*2500	13600	43400	11800	3950	2530	3580	*2000	E 1900	88600
1924	E 1800	E 1700	E 2000	8090	23200	40800	4980	2710	2150	E 2300	E 2100	E 1800	93600
1925	E 1600	E 1400	E 1800	E 4000	16200	23100	9220	3530	1740	E 1900	E 1700	E 1500	67700
1926	E 1400	E 1300	E 1500	*6000	30900	29400	9960	4010	2020	E 2100	E 1900	E 1600	92100
												Total	1491000
												Mean	87700

*Fractional Record.
E—Estimated.

[fol. 2503]

COMP. EXH. No. 52

Comparative Table Yearly Run-Off

Laramie River at Jelm, Wyoming

Laramie River Near Woods, Wyoming

Little Laramie River Near Filmore, Wyoming

Values in Acre Feet

R. I. Meeker, Irrigation Engr., April, 1933

Year	Laramie River at Jelm, Wyo.	Laramie River near Woods, Wyo.	Little Laramie near Filmore, Wyo.
1905	134,000	(a) 160,000	(b) 89,000
1911	126,000	(a) 151,000	70,000
12	189,000	206,000	120,000
13	101,000	110,000	66,000
14	185,000	189,000	93,000
15	85,100	92,200	54,900
16	129,000	153,000	62,800
17	239,000	274,000	135,000
18	150,000	182,000	108,000
19	76,200	81,000	44,800
20	166,000	216,000	104,000
21	171,000	205,000	104,000
22	81,600	104,000	61,400
23	175,000	201,000	88,600
24	133,000	170,000	93,600
25	91,900	(a) 105,000	67,700
26	156,000	(a) 183,000	92,100
27	116,000	(a) 137,000	(b) 80,000
28	153,000	(a) 180,000	(b) 98,000
29	156,000	(a) 183,000	(b) 100,000
30	99,800	(a) 118,000	(b) 72,000
31	74,900	(a) 80,000	(b) 46,000
32	121,000	145,000	(b) 82,000
Mean	135,000	158,000	84,000

(a) Determined from Jelm-Woods curve of annual flow.
(b) Determined from Jelm-Filmore curve of annual flow.

[fol. 2504]

COMP. EXH. No. 53

1923	175,000	201,000	88,600
24	133,000	170,000	93,600
25	91,900	(a) 105,000	67,700
26	156,000	(a) 183,000	92,100
27	116,000	(a) 137,000	(b) 80,000
28	153,000	(a) 180,000	(b) 98,000
29	156,000	(a) 183,000	(b) 100,000
30	99,800	(a) 118,000	(b) 72,000
31	74,900	(a) 80,000	(b) 46,000
32	121,000	145,000	(b) 62,000
Mean	128,000	150,000	82,000

(a) Determined from Jelm-Woods curve of annual flow.
(b) Determined from Jelm-Filmore curve of annual flow.

[fol. 2505] COMP. EXH. No. 54

Water Supply Laramie River Basin

Compiled and Deduced from Published Records of the U. S. Geological Survey, Biennial Reports of the State of Colorado and Biennial Reports of the State of Wyoming

R. I. Mecker, Irrigation Engineer April, 1933, Cheyenne

Average yearly flow	Long time means Acre Feet
Laramie River near Jelm, Wyoming, Colorado-Wyoming line interstate station, 23 year mean, 1905, 1911 to 1932 ..... Modern records with automatic gages.	135,000
Laramie River near Woods, Wyoming, at head of irrigated area on Laramie Plains, 23 year mean, 1905, 1911 to 1932	158,000 (a)
Little Laramie River near Filmore, Wyoming, at head of irrigated area on Laramie, Plains, 23 year mean, 1903, 1911 to 1932	84,000 (b)

(a) 1925 to 1931 records deduced from relation of flow at Jelm and Woods.

(b) 1926 to 1932 records deduced from relation of flow at Jelm and Filmore.

Average yearly flow	10-Year means 1923-32 Acre Feet
Laramie River near Jelm, Wyoming, Colorado-Wyoming interstate station	127,000
Laramie River near Woods, Wyoming	150,000
Little Laramie at Filmore, Wyoming	82,000

[fol. 2506] COMP. EXH. No. 55

Comparative Table

Water Supply Laramie River Basin

Modern Records Secured with Automatic Gages—Values in Acre Feet

Prepared from Exhibits

R. I. Meeker, April, 1933

Long Time Means	Nelson, 22 years	Meeker, 23 years
Laramie River at Colorado-Wyoming Line	135,560	135,000
Laramie River near Woods, Wyoming	158,240	158,000
Little Laramie River near Filmore, Wyoming	82,300	84,000

(Here follows photolithograph of cover page of Comp. Exhibit 55, side folio 2507)

COMPLAINANT'S EXHIBIT 56 1060A

INSTRUCTIONS

FOR

Installation and Tables of Discharge

FOR

Improved Venturi Flume

As Developed by the U. S. Department of Agriculture—Irrigation Investigations

Colorado Agriculture Experiment Station, Cooperating

EXHIBIT NO. 56
vs.
E. O. WHITTINGTON,

PUBLISHED
BY
STATE ENGINEER
Denver, Colorado
1930

[fol. 2508]

Free-Flow Discharge Table for Improved Venturi Flume

Computed from the Formula $Q=4WH_a^{1.522W^{0.026}}$

Discharge in Cubic Feet Per Second for Flumes of Various Widths

Upper Gage Head H_a									
Feet	Inches	1 foot	2 feet	3 feet	4 feet	5 feet	6 feet	7 feet	8 feet
0.20	2 3/8	0.35	0.66	0.97	1.26	.....	.....	.....	.....
.21	2 1/2	.37	.71	1.04	1.36	.....	.....	.....	.....
.22	2 5/8	.40	.77	1.12	1.47	.....	.....	.....	.....
.23	2 3/4	.43	.82	1.20	1.58	.....	.....	.....	.....
.24	2 7/8	.46	.88	1.28	1.69	.....	.....	.....	.....
.25	3	.49	.93	1.37	1.80	2.22	2.63	.....	.....
.26	3 1/8	.51	.99	1.46	1.91	2.36	2.80	.....	.....
.27	3 1/4	.54	1.05	1.55	2.03	2.50	2.97	.....	.....
.28	3 3/8	.58	1.11	1.64	2.15	2.65	3.15	.....	.....
.29	3 1/2	.61	1.18	1.73	2.27	2.70	3.33	.....	.....
.30	3 5/8	.64	1.24	1.82	2.39	2.96	3.52	4.08	4.62
.31	3 3/4	.68	1.30	1.92	2.52	3.12	3.71	4.30	4.88
.32	3 13/16	.71	1.37	2.02	2.65	3.28	3.90	4.52	5.13
.33	3 15/16	.74	1.44	2.12	2.78	3.44	4.10	4.75	5.39
.34	4 1/16	.77	1.50	2.22	2.92	3.61	4.30	4.98	5.66
.35	4 3/16	.80	1.57	2.32	3.06	3.88	4.50	5.22	5.93
.36	4 5/16	.84	1.64	2.42	3.19	3.95	4.71	5.46	6.20
.37	4 7/16	.88	1.72	2.53	3.34	4.13	4.92	5.70	6.48
.38	4 9/16	.92	1.79	2.64	3.48	4.31	5.13	5.95	6.76
.39	4 11/16	.95	1.86	2.75	3.62	4.49	5.35	6.20	7.05
.40	4 13/16	.99	1.93	2.86	3.77	4.68	5.57	6.46	7.34
.41	4 15/16	1.03	2.01	2.97	3.92	4.86	5.80	6.72	7.64
.42	5 1/16	1.07	2.09	3.08	4.07	5.05	6.02	6.98	7.94
.43	5 3/16	1.11	2.16	3.20	4.22	5.24	6.25	7.25	8.24
.44	5 1/4	1.15	2.24	3.32	4.38	5.43	6.48	7.52	8.55
.45	5 3/8	1.19	2.32	3.44	4.54	5.63	6.72	7.80	8.87
.46	5 1/2	1.23	2.40	3.56	4.70	5.83	6.96	8.08	9.19
.47	5 5/8	1.27	2.48	3.68	4.86	6.03	7.20	8.36	9.51
.48	5 3/4	1.31	2.57	3.80	5.03	6.24	7.44	8.65	9.84
.49	5 7/8	1.35	2.65	3.92	5.20	6.45	7.69	8.94	10.17
.50	6	1.39	2.73	4.05	5.36	6.66	7.94	9.23	10.51
.51	6 1/8	1.44	2.82	4.18	5.53	6.87	8.20	9.53	10.85
.52	6 1/4	1.48	2.90	4.31	5.70	7.09	8.46	9.83	11.19
.53	6 3/8	1.52	2.99	4.44	5.88	7.30	8.72	10.14	11.54
.54	6 1/2	1.57	3.08	4.57	6.05	7.52	8.98	10.45	11.89
.55	6 5/8	1.62	3.17	4.70	6.23	7.74	9.25	10.76	12.24
.56	6 3/4	1.66	3.26	4.84	6.41	7.97	9.52	11.07	12.60
.57	6 13/16	1.70	3.35	4.98	6.59	8.20	9.79	11.39	12.96
.58	6 15/16	1.75	3.44	5.11	6.77	8.43	10.07	11.71	13.33
.59	7 1/16	1.80	3.53	5.25	6.96	8.66	10.35	12.03	13.70

[fol. 2509] Free-Flow Discharge Table for Improved Venturi Flume—Continued

Computed from the Formula $Q=4WH_a^{1.522W^{0.026}}$

Discharge in Cubic Feet Per Second for Flumes of Various Widths

Upper Gage Head H_a									
Feet	Inches	1 foot	2 feet	3 feet	4 feet	5 feet	6 feet	7 feet	8 feet
.60	7 3/16	1.84	3.62	5.39	7.15	8.89	10.63	12.36	14.08
.61	7 5/16	1.88	3.72	5.53	7.34	9.13	10.92	12.69	14.46
.62	7 7/16	1.93	3.81	5.68	7.53	9.37	11.20	13.02	14.84
.63	7 9/16	1.98	3.91	5.82	7.72	9.61	11.49	13.36	15.23
.64	7 11/16	2.03	4.01	5.97	7.91	9.85	11.78	13.70	15.62
.65	7 13/16	2.08	4.11	6.12	8.11	10.10	12.08	14.05	16.01
.66	7 15/16	2.13	4.20	6.26	8.31	10.34	12.38	14.40	16.41
.67	8 1/16	2.18	4.30	6.41	8.51	10.59	12.68	14.75	16.81
.68	8 3/16	2.23	4.40	6.56	8.71	10.85	12.98	15.10	17.22
.69	8 1/4	2.28	4.50	6.71	8.91	11.10	13.28	15.46	17.63
.70	8 3/8	2.33	4.60	6.86	9.11	11.36	13.59	15.82	18.04
.71	8 1/2	2.38	4.70	7.02	9.32	11.62	13.90	16.18	18.45
.72	8 5/8	2.43	4.81	7.17	9.53	11.88	14.22	16.55	18.87
.73	8 3/4	2.48	4.91	7.33	9.74	12.14	14.53	16.92	19.29
.74	8 7/8	2.53	5.02	7.49	9.95	12.40	14.85	17.29	19.71
.75	9	2.58	5.12	7.65	10.16	12.67	15.17	17.66	20.14
.76	9 1/8	2.63	5.23	7.81	10.38	12.94	15.49	18.04	20.57
.77	9 1/4	2.68	5.34	7.97	10.60	13.21	15.82	18.42	21.01
.78	9 3/8	2.74	5.44	8.13	10.81	13.48	16.15	18.81	21.46
.79	9 1/2	2.80	5.55	8.30	11.03	13.76	16.48	19.20	21.91
.80	9 5/8	2.85	5.66	8.46	11.25	14.04	16.81	19.59	22.36
.81	9 3/4	2.90	5.77	8.63	11.48	14.32	17.15	19.99	22.81
.82	9 13/16	2.96	5.88	8.79	11.70	14.60	17.49	20.39	23.26
.83	9 15/16	3.02	6.00	8.96	11.92	14.88	17.83	20.79	23.72
.84	10 1/16	3.07	6.11	9.13	12.15	15.17	18.17	21.18	24.18
.85	10 3/16	3.12	6.22	9.30	12.38	15.46	18.52	21.58	24.64
.86	10 5/16	3.18	6.33	9.48	12.61	15.75	18.87	21.99	25.11
.87	10 7/16	3.24	6.44	9.65	12.84	16.04	19.22	22.40	25.58
.88	10 9/16	3.29	6.56	9.82	13.07	16.33	19.57	22.82	26.06
.89	10 11/16	3.35	6.68	10.00	13.31	16.62	19.93	23.24	26.54
.90	10 13/16	3.41	6.80	10.17	13.55	16.92	20.29	23.66	27.02
.91	10 15/16	3.46	6.92	10.35	13.79	17.22	20.65	24.08	27.50
.92	11 1/16	3.52	7.03	10.52	14.03	17.52	21.01	24.50	27.99
.93	11 3/16	3.58	7.15	10.71	14.27	17.82	21.38	24.93	28.48
.94	11 1/4	3.64	7.27	10.89	14.51	18.13	21.75	25.36	28.97
.95	11 3/8	3.70	7.39	11.07	14.76	18.44	22.12	25.79	29.47
.96	11 1/2	3.76	7.51	11.26	15.00	18.75	22.49	26.22	29.97
.97	11 5/8	3.82	7.63	11.44	15.25	19.06	22.86	26.66	30.48
.98	11 3/4	3.88	7.75	11.63	15.50	19.37	23.24	27.10	30.98
.99	11 7/8	3.94	7.88	11.82	15.75	19.68	23.62	27.55	31.49

[fol. 2510]

1.00	12	4.00	8.00	12.00	16.00	20.00	24.00	28.00	32.00
1.01	12 1/8	4.06	8.12	12.19	16.25	20.32	24.38	28.45	32.52
1.02	12 1/4	4.12	8.25	12.38	16.51	20.64	24.77	28.90	33.04
1.03	12 3/8	4.18	8.38	12.57	16.76	20.96	25.16	29.36	33.56
1.04	12 1/2	4.25	8.50	12.76	17.02	21.28	25.55	29.82	34.08

Free-Flow Dischrage Table for Improved Venturi Flume—Continued

Computed from the Formula $Q=4WH_a^{1.522W^{0.026}}$

Discharge in Cubic Feet Per Second for Flumes of Various Widths

Upper Gage Head H_a								
Feet	Inches	1 foot	2 feet	3 feet	4 feet	5 feet	6 feet	7 feet	8 feet
1.05	12 5/8	4.31	8.63	12.96	17.28	21.61	25.94	30.28	34.61
1.06	12 3/4	4.37	8.76	13.15	17.54	21.94	26.34	30.74	35.14
1.07	12 13/16	4.43	8.88	13.34	17.80	22.27	26.74	31.20	35.68
1.08	12 15/16	4.50	9.01	13.54	18.07	22.60	27.13	31.67	36.22
1.09	13 1/16	4.56	9.14	13.74	18.34	22.93	27.53	32.14	36.76
1.10	13 3/16	4.62	9.27	13.93	18.60	23.26	27.94	32.62	37.30
1.11	13 5/16	4.68	9.40	14.13	18.86	23.60	28.35	33.10	37.84
1.12	13 7/16	4.75	9.54	14.33	19.13	23.94	28.76	33.58	38.39
1.13	13 9/16	4.82	9.67	14.53	19.40	24.28	29.17	34.06	38.94
1.14	13 11/16	4.88	9.80	14.73	19.67	24.62	29.58	34.54	39.50
1.15	13 13/16	4.94	9.94	14.94	19.94	24.96	30.00	35.02	40.06
1.16	13 15/16	5.01	10.07	15.14	20.22	25.31	30.41	35.51	40.62
1.17	14 1/16	5.08	10.20	15.34	20.50	25.66	30.83	36.00	41.18
1.18	14 3/16	5.15	10.34	15.55	20.78	26.01	31.25	36.50	41.75
1.19	14 1/4	5.21	10.48	15.76	21.05	26.36	31.68	37.00	42.32
1.20	14 3/8	5.28	10.61	15.96	21.33	26.71	32.10	37.50	42.89
1.21	14 1/2	5.34	10.75	16.17	21.61	27.06	32.53	38.00	43.47
1.22	14 5/8	5.41	10.89	16.38	21.90	27.42	32.96	38.50	44.05
1.23	14 3/4	5.48	11.03	16.60	22.18	27.78	33.39	39.00	44.64
1 24	14 7/8	5.55	11.17	16.81	22.47	28.14	33.82	39.51	45.22
1.25	15	5.62	11.31	17.02	22.75	28.50	34.26	40.02	45.80
1.26	15 1/8	5.69	11.45	17.23	23.04	28.86	34.70	40.54	46.38
1.27	15 1/4	5.76	11.59	17.44	23.33	29.22	35.14	41.05	46.97
1.28	15 3/8	5.82	11.73	17.66	23.62	29.59	35.58	41.57	47.57
1.29	15 1/2	5.89	11.87	17.88	23.92	29.96	36.02	42.09	48.17
1.30	15 5/8	5.96	12.01	18.10	24.21	30.33	36.47	42.62	48.78
1.31	15 3/4	6.03	12.16	18.32	24.50	30.70	36.92	43.14	49.38
1.32	15 13/16	6.10	12.30	18.54	24.80	31.07	37.37	43.67	49.99
1.33	15 15/16	6.18	12.44	18.76	25.10	31.44	37.82	44.20	50.60
1.34	16 1/16	6.25	12.59	18.98	25.39	31.82	38.28	44.73	51.22
1.35	16 3/16	6.32	12.74	19.20	25.69	32.20	38.74	45.26	51.84
1.36	16 5/16	6.39	12.89	19.42	25.99	32.58	39.20	45.80	52.46
1.37	16 7/16	6.46	13.03	19.64	26.30	32.96	39.66	46.35	53.08
1.38	16 9/16	6.53	13.18	19.87	26.60	33.34	40.12	46.89	53.70
1.39	16 11/16	6.60	13.33	20.10	26.90	33.72	40.58	47.44	54.33

[fol. 2511]

1.40	16 13/16	6.68	13.48	20.32	27.21	34.11	41.05	47.99	54.95
1.41	16 15/16	6.75	13.63	20.55	27.52	34.50	41.52	48.54	55.58
1.42	17 1/16	6.82	13.78	20.78	27.82	34.89	41.99	49.00	56.22
1.43	17 3/16	6.89	13.93	21.01	28.13	35.28	42.46	49.64	56.86
1.44	17 1/4	6.97	14.08	21.24	28.45	35.67	42.94	50.20	57.50
1.45	17 3/8	7.04	14.23	21.47	28.76	36.06	43.42	50.76	58.14
1.46	17 1/2	7.12	14.38	21.70	29.07	36.46	43.89	51.32	58.78
1.47	17 5/8	7.19	14.54	21.94	29.38	36.86	44.37	51.88	59.33
1.48	17 3/4	7.26	14.69	22.17	29.70	37.26	44.85	52.45	60.08
1.49	17 7/8	7.34	14.85	22.41	30.02	37.66	45.34	53.02	60.74

Free-Flow Discharge Table for Improved Venturi Flume—Continued

Computed from the Formula $Q=4WH_a^{1.522W^{0.026}}$

Discharge in Cubic Feet Per Second for Flumes of Various Widths

Upper Gage Head H_a									
Feet	*Inches*	1 foot	2 feet	3 feet	4 feet	5 feet	6 feet	7 feet	8 feet
1.50	18	7.41	15.00	22.64	30.34	38.06	45.82	53.59	61.40
1.51	18 1/8	7.49	15.16	22.88	30.66	38.46	46.31	54.16	62.06
1.52	18 1/4	7.57	15.31	23.12	30.98	38.87	46.80	54.74	62.72
1.53	18 3/8	7.64	15.47	23.36	31.30	39.28	47.30	55.32	63.38
1.54	18 1/2	7.72	15.62	23.60	31.63	39.68	47.79	55.90	64.04
1.55	18 5/8	7.80	15.78	23.84	31.95	40.09	48.28	56.48	64.71
1.56	18 3/4	7.87	15.94	24.08	32.27	40.51	48.78	57.06	65.38
1.57	18 13/16	7.95	16.10	24.32	32.60	40.92	49.28	57.65	66.06
1.58	18 15/16	8.02	16.26	24.56	32.93	41.33	49.78	58.24	66.74
1.59	19 1/16	8.10	16.42	24.80	33.26	41.75	50.28	58.33	67.42
1.60	19 3/16	8.18	16.58	25.05	33.59	42.17	50.79	59.42	68.10
1.61	19 5/16	8.26	16.74	25.30	33.92	42.59	51.30	60.02	68.79
1.62	19 7/16	8.34	16.90	25.54	34.26	43.01	51.81	60.62	69.48
1.63	19 9/16	8.42	17.06	25.79	34.60	43.43	52.32	61.22	70.17
1.64	19 11/16	8.49	17.22	26.04	34.93	43.86	52.83	61.82	70.86
1.65	19 13/16	8.57	17.38	26.29	35.26	44.28	53.34	62.42	71.56
1.66	19 15/16	8.65	17.55	26.54	35.60	44.70	53.86	63.03	72.26
1.67	20 1/16	8.73	17.72	26.79	35.94	45.13	54.38	63.64	72.96
1.68	20 3/16	8.81	17.88	27.04	36.28	45.56	54.90	64.25	73.66
1.69	20 1/4	8.89	18.04	27.30	36.62	46.00	55.42	64.86	74.37
1.70	20 3/8	8.97	18.21	27.55	36.96	46.43	55.95	65.48	75.08
1.71	20 1/2	9.05	18.38	27.80	37.30	46.86	56.48	66.10	75.79
1.72	20 5/8	9.13	18.54	28.06	37.65	47.30	57.00	66.72	76.50
1.73	20 3/4	9.21	18.71	28.32	38.00	47.74	57.53	67.34	77.22
1.74	20 7/8	9.29	18.88	28.57	38.34	48.17	58.06	67.96	77.94
1.75	21	9.38	19.04	28.82	38.69	48.61	58.60	68.59	78.66
1.76	21 1/8	9.46	19.21	29.08	39.04	49.05	59.13	69.22	79.38
1.77	21 1/4	9.54	19.38	29.34	39.39	49.50	59.67	69.85	80.10
1.78	21 3/8	9.62	19.55	29.60	39.74	49.94	60.20	70.48	80.83
1.79	21 1/2	9.70	19.72	29.87	40.10	50.38	60.74	71.11	81.56
[fol. 2512]									
1.80	21 5/8	9.79	19.90	30.13	40.45	50.83	61.29	71.75	82.89
1.81	21 3/4	9.87	20.07	30.39	40.80	51.28	61.83	72.39	83.03
1.82	21 13/16	9.95	20.24	30.65	41.16	51.73	62.38	73.03	83.77
1.83	21 15/16	10.04	20.42	30.92	41.52	52.18	62.92	73.68	84.51
1.84	22 1/16	10.12	20.59	31.18	41.88	52.64	63.46	74.33	85.25
1.85	22 3/16	10.20	20.76	31.45	42.24	53.09	64.01	74.98	86.00
1.86	22 5/16	10.29	20.93	31.71	42.60	53.55	64.57	75.63	86.75
1.87	22 7/16	10.38	21.10	31.98	42.96	54.00	65.13	76.28	87.50
1.88	22 9/16	10.46	21.28	32.25	43.32	54.46	65.69	76.93	88.25
1.89	22 11/16	10.54	21.46	32.52	43.69	54.92	66.25	77.58	89.00
1.90	22 13/16	10.62	21.63	32.79	44.05	55.39	66.81	78.24	89.76
1.91	22 15/16	10.71	21.81	33.06	44.42	55.85	67.37	78.90	90.52
1.92	23 1/16	10.80	21.99	33.33	44.79	56.32	67.93	79.56	91.28
1.93	23 3/16	10.88	22.17	33.60	45.16	56.78	68.50	80.23	92.05
1.94	23 1/4	10.97	22.35	33.87	45.53	57.25	69.06	80.90	92.82

Free-Flow Discharge Table for Improved Venturi Flume—Continued

Computed from the Formula $Q=4WH_a^{1.522W^{0.026}}$

Discharge in Cubic Feet Per Second for Flumes of Various Widths

Upper Gage Head H_a									
Feet	Inches	1 foot	2 feet	3 feet	4 feet	5 feet	6 feet	7 feet	8 feet
1.95	23 3/8	11.06	22.53	34.14	45.99	57.72	69.63	81.57	93.59
1.96	23 1/2	11.14	22.70	34.42	46.27	58.19	70.20	82.24	94.36
1.97	23 5/8	11.23	22.88	34.70	46.64	58.67	70.79	82.91	95.14
1.98	23 3/4	11.31	23.06	34.97	47.02	59.14	71.35	83.58	95.92
1.99	23 7/8	11.40	23.24	35.25	47.40	59.61	71.92	84.26	96.70
2.00	24	11.49	23.43	35.53	47.77	60.08	72.50	84.94	97.48
2.01	24 1/8	11.58	23.61	35.81	48.14	60.56	73.08	85.62	98.26
2.02	24 1/4	11.66	23.79	36.09	48.52	61.04	73.66	86.30	99.05
2.03	24 3/8	11.75	23.98	36.37	48.90	61.52	74.24	86.99	99.84
2.04	24 1/2	11.84	24.16	36.65	49.29	62.00	74.83	87.68	100.63
2.05	24 5/8	11.93	24.34	36.94	49.67	62.48	75.42	88.37	101.42
2.06	24 3/4	12.02	24.52	37.22	50.05	62.97	76.00	89.06	102.22
2.07	24 13/16	12.10	24.70	37.50	50.44	63.46	76.59	89.75	103.02
2.08	24 15/16	12.19	24.89	37.78	50.82	63.94	77.19	90.44	103.82
2.09	25 1/16	12.28	25.08	38.06	51.21	64.43	77.78	91.14	104.62
2.10	25 3/16	12.37	25.27	38.35	51.59	64.92	78.37	91.84	105.43
2.11	25 5/16	12.46	25.46	38.64	51.98	65.40	78.97	92.54	106.24
2.12	25 7/16	12.55	25.64	38.93	52.37	65.91	79.56	93.25	107.05
2.13	25 9/16	12.64	25.83	39.22	52.76	66.40	80.15	93.95	107.86
2.14	25 11/16	12.73	26.01	39.50	53.15	66.89	80.75	94.66	108.67
2.15	25 13/16	12.82	26.20	39.79	53.54	67.39	81.36	95.37	109.48
2.16	25 15/16	12.92	26.39	40.08	53.94	67.89	81.97	96.08	110.30
2.17	26 1/16	13.01	26.58	40.37	54.34	68.39	82.58	96.79	111.12
2.18	26 3/16	13.10	26.77	40.66	54.73	68.89	83.19	97.51	111.95
2.19	26 1/4	13.19	26.96	40.96	55.12	69.39	83.80	98.23	112.78
[fol. 2513]									
2.20	26 3/8	13.28	27.20	41.25	55.52	69.90	84.41	98.94	113.60
2.21	26 1/2	13.37	27.40	41.54	55.92	70.40	85.02	99.66	114.40
2.22	26 5/8	13.46	27.59	41.84	56.32	70.90	85.63	100.40	115.30
2.23	26 3/4	13.56	27.78	42.13	56.72	71.41	86.25	101.10	116.10
2.24	26 7/8	13.65	27.98	42.43	57.12	71.92	86.87	101.80	116.90
2.25	27	13.74	28.17	42.73	57.52	72.43	87.49	102.60	117.80
2.26	27 1/8	13.84	28.36	43.02	57.93	72.94	88.11	103.30	118.60
2.27	27 1/4	13.93	28.56	43.32	58.34	73.46	88.73	104.00	119.50
2.28	27 3/8	14.01	28.75	43.62	58.74	73.97	89.35	104.80	120.30
2.29	27 1/2	14.12	28.95	43.92	59.15	74.49	89.98	105.50	121.20
2.30	27 5/8	14.21	29.15	44.22	59.56	75.01	90.61	106.20	122.00
2.31	27 3/4	14.30	29.34	44.52	59.96	75.52	91.24	107.00	122.90
2.32	27 13/16	14.40	29.54	44.83	60.37	76.04	91.87	107.70	123.70
2.33	27 15/16	14.49	29.74	45.13	60.79	76.57	92.50	108.50	124.60
2.34	28 1/16	14.59	29.94	45.43	61.20	77.09	93.14	109.20	125.40
2.35	28 3/16	14.68	30.13	45.74	61.61	77.61	93.77	110.00	126.30
2.36	28 5/16	14.78	30.33	46.04	62.03	78.13	94.41	110.70	127.20
2.37	28 7/16	14.87	30.53	46.35	62.44	78.66	95.05	111.50	128.00
2.38	28 9/16	14.97	30.73	46.66	62.86	79.19	95.69	112.20	128.90
2.39	28 11/16	15.07	30.93	46.96	63.27	79.72	96.33	113.00	129.80

Free-Flow Discharge Table for Improved Venturi Flume—Continued

Computed from the Formula $Q=4WH_a^{1.522W^{0.026}}$

Discharge in Cubic Feet Per Second for Flumes of Various Widths

Upper Gage Head H_a								
Feet	Inches	1 foot	2 feet	3 feet	4 feet	5 feet	6 feet	7 feet	8 feet
2.40	28 13/16	15.16	31.13	47.27	63.69	80.25	96.97	113.70	130.70
2.41	28 15/16	15.26	31.33	47.58	64.11	80.78	97.62	114.50	131.50
2.42	29 1/16	15.35	31.54	47.89	64.53	81.31	98.27	115.30	132.40
2.43	29 3/16	15.45	31.74	48.20	64.95	81.84	98.91	116.00	133.30
2.44	29 1/4	15.55	31.94	48.51	65.38	82.38	99.56	116.80	134.20
2.45	29 3/8	15.64	32.14	48.82	65.80	82.92	100.20	117.60	125.10
2.46	29 1/2	15.74	32.35	49.13	66.23	83.45	100.90	118.30	135.90
2.47	29 5/8	15.84	32.55	49.45	66.65	83.99	101.50	119.10	136.80
2.48	29 3/4	15.94	32.76	49.76	67.07	84.53	102.20	119.90	137.70
2.49	29 7/8	16.03	32.96	50.08	67.50	85.07	102.80	120.60	138.60
2.50	30	16.13	33.71	50.39	67.93	85.62	103.50	121.40	139.50

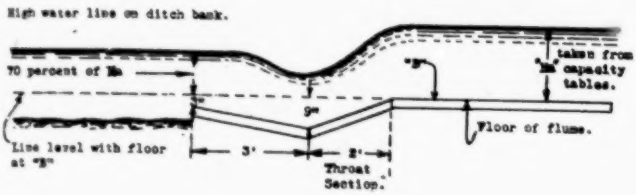
STANDARD DIMENSIONS AND CAPACITIES

IMPROVED VENTURI FLUME

Note—Refer to Isometric Drawing

Crest Width	Dimensions in Feet						Discharge Capacity in Cu. Ft. Per Sec. Free Flow Conditions			
							Maximum		Minimum	
W	A	2/3 A	B	2/3 B	C	D	Ha	Sec. Ft.	Ha	Sec. Ft.
1	4'-6"	3'-0"	4'- 4⅞"	2'-11¼"	2	2'- 9¼"	2.50	16.1	0.20	0.35
2	5'-0"	3'-4"	4'-10¾"	3'- 3¼"	3	3'-11½"	2.50	33.2	0.20	0.66
3	5'-6"	3'-8"	5'- 4⅝"	3'- 7⅛"	4	5'- 1⅞"	2.50	50.4	0.20	0.97
4	6'-0"	4'-0"	5'-10⅝"	3'-11⅛"	5	6'- 4¼"	2.50	67.9	0.20	1.26
5	6'-6"	4'-4"	6'- 4½"	4'- 3"	6	7'- 6⅝"	2.50	85.6	0.25	2.22
6	7'-0"	4'-8"	6'-10½"	4'- 7"	7	8'- 9"	2.50	103.5	0.25	2.63
8	8'-0"	5'-4"	7'-10⅛"	5'- 2¾"	9	11'- 1⅜"	2.50	139.5	0.30	4.62

DIRECTIONS FOR PLACING VENTURI FLUME



First—Select from Table of flume capacities, the proper depth of water or head "Ha" that corresponds with the maximum capacity of the ditch, so that "Ha" will ordinarily not exceed one-half of the width of throat "W" which may be adopted.

Second—Locate the **high water line** on the ditch bank where the flume is to be installed, as shown by previous flows.

Third—Place the surface of the floor "B" at a depth of 70 per cent of "Ha," below the high water line.

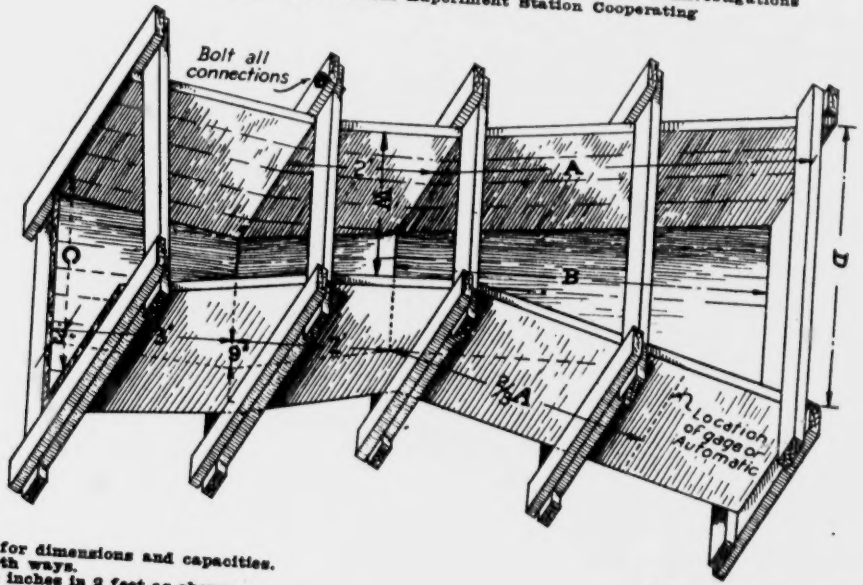
Fourth—Place the floor "B" level both length and crosswise and construct all flume bottoms with the drop and rise and of the lengths as shown by above sketch.

Fifth—Place gage on side of flume at a distance upstream from the throat, equal to two-thirds the distance "A."

Sixth—Provide cut-off wall, and wings at **each** end of flume at 45 degree angles, to prevent water cutting under or around same.

VENTURI FLUME

As Developed by U. S. Department of Agriculture—Irrigation Investigations
Colorado Agricultural Experiment Station Cooperating



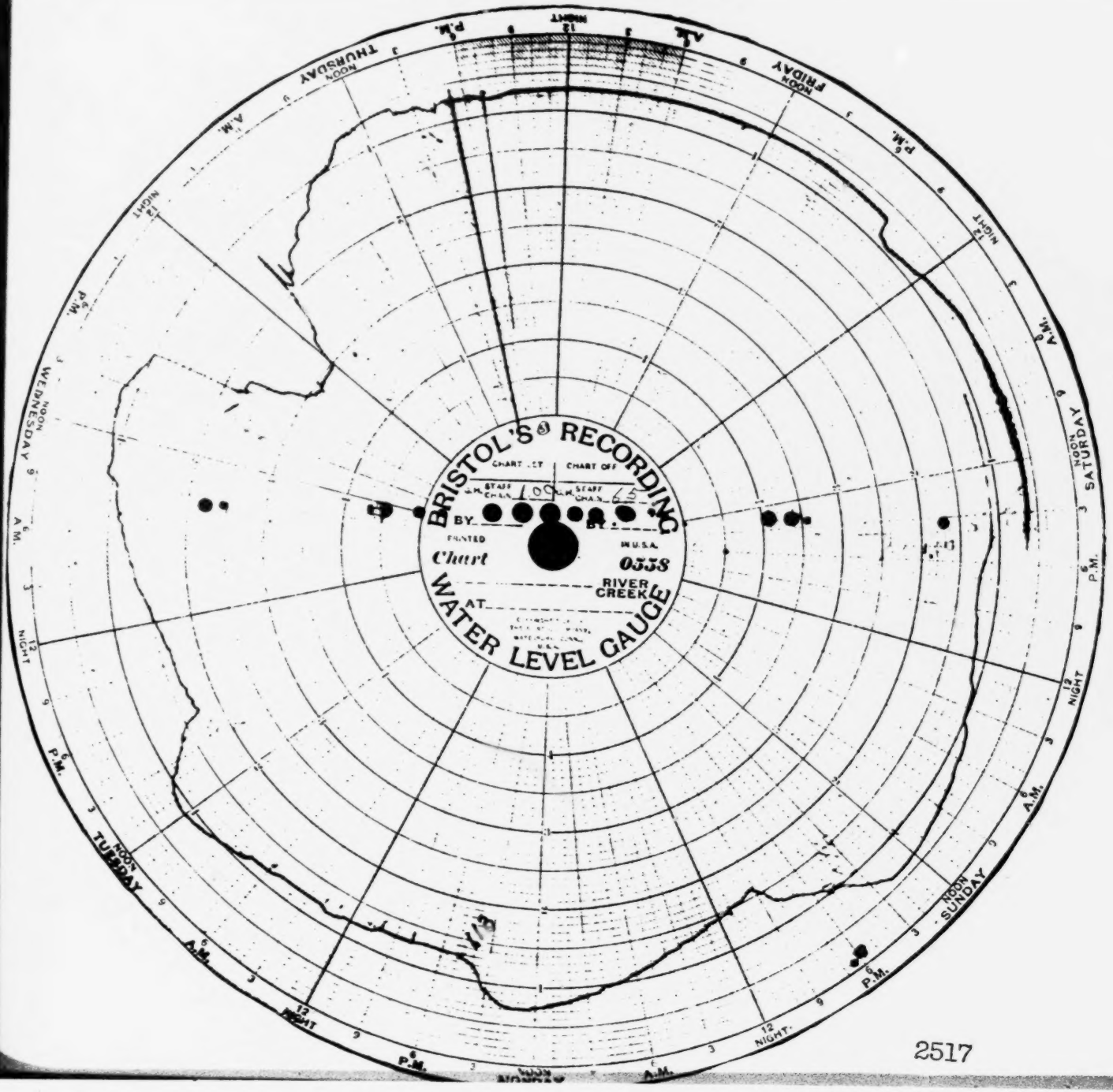
Note—Refer to Table for dimensions and capacities.
Make Floor B level both ways.
Slope Floor of throat 9 inches in 2 feet as shown.
Raise lower end of Floor 6 inches in 3 feet as shown,
leaving lower end 3 inches lower than upper end of flume.

OFFICE OF STATE ENGINEER
DENVER, COLORADO
1926

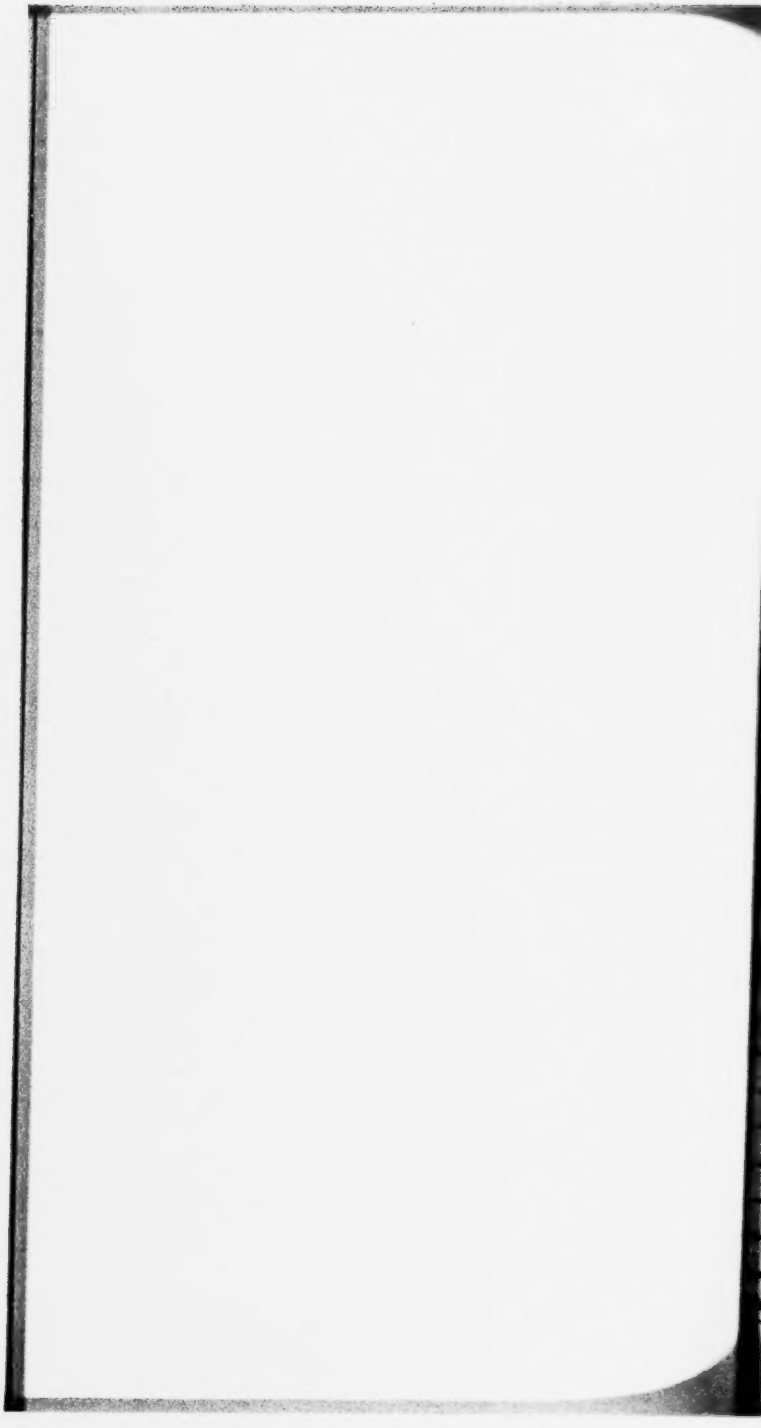
9515

COMPLAINANT'S EXHIBIT 57

COMPLAINANT'S EXHIBIT 58



2517



COMPLAINANT'S EXHIBIT 59

ENGINEERING DEPARTMENT

DATE May 24 1927 **CURRENT METER NOTES** TIME BEGIN 5 END 5-30

DIV. 1 DIST. 3

Larime Tunnel RIVER, AT Venturi Flume

GAGE HT. BEGINNING 1.08 FT. ENDING 1.08 FT. MEAN 1.08 FT. METER NO.

MEAS NOTES BY

Depth	Depth of observat.	Revolutions	Time in seconds	VELOCITY At point	VELOCITY Mean in vertical	VELOCITY Mean in section	Area	Mean Depth	Width	Discharge
1.08		40	56		1.56					
						1.79	1.08	1.08	1.0	1.93
1.08		40	43		2.02					
						2.23	1.08	1.08	1.0	2.40
1.08		40	35		2.44					
						2.54	1.06	1.06	1.0	2.69
1.05		50	41		2.60					
						2.68	1.05	1.05	1.0	2.81
1.05		50	46		2.71					
						2.64	1.05	1.05	1.0	2.77
1.05		50	47		2.57					
						2.52	1.05	1.05	1.0	2.64
1.05		50	44		2.46					
						2.46	1.05	1.05	1.0	2.58
1.05		50	44		2.46					
						2.53	1.05	1.05	1.0	2.66
1.05		50	41½		2.61					
						2.60	.19	1.05	.18	.52
1.05					2.60					23.78

Flow thru Flume not uniform due to Pt L
Tuck in Channel 30' above.
About .10 S.F leakage under Flume
Gage rod placed in Still well by Sounding at
Headwater in Flume with Sharp edge Ruler

PLACE NOTES ON BACK OF SHEET

2518

ENGINEERING DEPARTMENT

DATE May 25 1927 CURRENT METER NOTES TIME {BEGIN 6:45AM / END}

DIV. 1 DIST. 3

Laramie Poudre Tunnel RIVER AT Venturi Flume

GAGE HT. BEGINNING 0.66 FT. ENDING 0.66 FT. MEAN 0.66 FT. METER NO.

MEAS NOTES BY

Dist. from initial point	Depth	Depth of observat.	Revolutions	Time in seconds	VELOCITY: At point	VELOCITY: Mean in vertical	VELOCITY: Mean in section	Area	Mean Depth	Width	Discharge
0	.64	06 From Top	30	69	.95						
							1.16	0.66	.66	1.0	0.76
1	.68	06	30	47½	1.36						
							1.49	0.66	.66	1.0	.98
2	.65		30	40½	1.62						
							1.68	0.65	.65	1.0	1.09
3	.65		40	50	1.74						
							1.74	0.66	.66	1.0	1.15
4	.67		40	50	1.74						
							1.74	0.66	.66	1.0	1.14
5	.65		40	58½	1.70						
							1.61	0.66	.66	1.0	1.06
6	.66		40	57	1.53						
							1.54	0.65	.65	1.0	.99
7	.65		40	58	1.51						
							1.50	0.66	.66	1.0	.99
8	.67		30	"	1.50						
							1.55	0.12	.67	0.18	0.17
8.18	.67				1.40						8.33
			Water ordered cut down at 7 PM May 24								
			Chart shows ceased to drop at 10 P.M.								
			Automatic accurately set to correspond with								
			Gage in Well - Off about 20 min. in time.								
			Instructed Mr. S. I. C. Turner Observer. how to read								
Totals	Replaced Charts + marked same										

PLACE NOTES ON BACK OF SHEET M6M. 25

STATE OF COLORADO
ENGINEERING DEPARTMENT

DATE 4-29-3 1929 CURRENT METER NOTES TIME {BEGIN / END}

DIV. 1 DIST. 4-7

Poudre Tunnel RIVER AT

GAGE HT. BEGINNING 0.54 FT. ENDING 0.54 FT. MEAN FT. METER NO.

MEAS NOTES BY

Dist. from initial point	Depth	Depth of observat.	Revolutions	Time in seconds	VELOCITY: At point	VELOCITY: Mean in vertical	VELOCITY: Mean in section	Area	Mean Depth	Width	Discharge
0	.70		40	40½		2.22		✓			✓
1	.72		40	40		2.25	2.24	.71			1.59
2	.76		30	35		1.93	2.09	.74			1.55
3	.74		30	37		1.83	1.88	.75			1.41
4	.70		30	43½		1.56	1.70	.72			1.22
5	.74		30	45		1.50	1.53	.72			1.10
6	.72		20	45½		1.00	1.25	.73			.91
7	.70		20	36½		1.24	1.17	.71			.80
8.3	.70		20	40½		1.12	1.18	.91	70	13	1.07
											9.65
				8.98							
			6 ft. flume								
Totals											

PLACE NOTES ON BACK OF SHEET

2520

1174

ENGINEERING DEPARTMENT

DATE May 29 19 30 CURRENT METER NOTES TIME {BEGIN / END

DIV. DIST. 3

Tunnel Outlet RIVER, AT R F Ventura

GAGE HT. BEGINNING FT. ENDING FT. MEAN FT. METER NO.

MEAS. NOTES BY

Dist. from initial point	Depth	Depth of observat.	Revolutions	Time in seconds	VELOCITY: At point	VELOCITY: Mean in vertical	VELOCITY: Mean in section	Area	Mean Depth	Width	Discharge
0	.78		5	60		.22					
1	.78		20	60		.77	.50	.78			.39
2	.68		30	53		1.28	1.02	.73			.74
3	.70		30	47½		1.44	1.36	.69			.94
4	.80		30	43½		1.56	1.50	.75			1.12
5	.70		40	43		2.11	1.80	.75			1.38
6	.78		40	52		1.74	1.92	.74			1.42
7	.80		40	52		1.74	1.74	.79			1.37
8	.80		40	47		1.93	1.84	.80			1.47
9	.78		40	47		1.93	1.93	.79			1.52
10	.76		30	41½		1.64	1.78	.77			1.37
11.2	.80		30	48		1.42	1.53	.94	.78	1.2	1.44
						12.38					13.12
Totals											

PLACE NOTES ON BACK OF SHEET

ENGINEERING DEPARTMENT

DATE July 4 1930 **CURRENT METER NOTES** TIME BEGIN END 9 A.M.

DIV. DIST.

Cesarme Poudre Tunnel RIVER, AT Rating Flume

GAGE HT. BEGINNING 0.60 FT. ENDING FT. MEAN FT. METER NO.

MEAS. J.H. Baily NOTES BY Mrs. Baily

Dist. from initial point	Depth	Depth of observat.	Revolutions	Time in seconds	VELOCITY At point	VELOCITY Mean in vertical	VELOCITY Mean in section	Area	Mean Depth	Width	Discharge
						✓	✓				
0	0.68		40	51½		1.76					
1	0.70		40	46		1.97	1.86	.69			1.28
2	0.76		40	40½		2.24	2.10	.73			1.53
3	0.78		40	42½		2.14	2.19	.77			1.69
4	0.76		40	47		1.93	2.04	.77			1.57
5	0.74		40	49		1.85	1.89	.75			1.42
6	0.72		30	39		1.74	1.80	.73			1.31
7	0.74		30	46		1.49	1.61	.73			1.18
8	0.78		20	50		.92	1.20	.76			.91
9.3	0.76		5	38		.32	.62	1.00	.77		.62
											11.51
Totals											

PLACE NOTES ON BACK OF SHEET

2522

1076

ENGINEERING DEPARTMENT

DATE Aug 5 1930 **CURRENT METER NOTES** TIME { BEGIN ..... END .....

DIV. ..... DIST. .....

Larimie P. Tunnel RIVER, AT .....

GAGE HT. BEGINNING 0.45 FT. ENDING ..... FT. MEAN ..... FT. METER NO. .....

MEAS. Baily NOTES BY .....

Dist. from initial point	Depth	Depth of observat.	Revolutions	Time in seconds	VELOCITY At point	VELOCITY Mean in vertical	VELOCITY Mean in section	Area	Mean Depth	Width	Discharge
0	.6		20	46		1.03	✓	✓			
1	.6		20	44½		1.06	1.04	.6			.64
2	.6		20	37		1.27	1.16	.6			.70
3	.6		20	37		1.27	1.27	.6			.76
4	.6		20	38		1.24	1.26	.6			.70
5	.6		20	35½		1.32	1.28	.6			.77
6	.6		20	35½		1.32	1.32	.6			.79
7	.6		20	33½		1.40	1.36	.6			.82
8	.58		20	31		1.51	1.46	.59			.80
9.5	.54		20	36		1.30	1.40	.84	.56		1.18
											7.28
Totals											

Checks Outside Gage

PLACE NOTES ON BACK OF SHEET

2523

DATE 7-..... 1932 **CURRENT METER NOTES** TIME { BEGIN ..... END .....

DIV ..... DIST .....

Laramie-Poudre Tunnel RIVER, AT 6' Venturi Outlet

GAGE HT. BEGINNING 1.09 FT. ENDING 1.13 FT. MEAN 1.11 FT. METER NO. Nichols

MEAS. M.C. Hinderlider NOTES BY R.L. Parshall (2.214-48)

Point of observation	Depth	Depth of observation	Revolutions	Time in seconds	VELOCITY: At point	VELOCITY: Mean in vertical	VELOCITY: Mean in section	Area	Mean Depth	Width	Discharge
0	1.37	0.2	116	60		4.30					
1	1.33		50	27		4.13	4.22	1.35		1	5.70
2	1.32		60	24.2		5.52	4.82	1.32		1	6.36
3	1.30		80	32.8		5.54	5.53	1.31		1	7.24
4	1.31		80	45		3.97	4.76	1.30		1	6.19
5	1.37		50	47.6		2.38	3.18	1.34		1	4.26
6	1.35		50	6.72		1.68	2.03	1.36		1	2.76
7	1.30		15	16.6		0.63	1.16	1.32		1	1.53
7.7	1.30		20	6.0		0.78	0.70	0.92	1.32	0.7	0.64
											34.68
0	1.32										
1											
2											
3											
4											
5											
6											
7											
7.7											
Totals											

3 0.8 6.8 3.5 / 6.0

1.30 0.8 3.3 / 1.9

17% Long

PLACE NOTES ON BACK OF SHEET

1078

ENGINEERING DEPARTMENT

DATE 6-18-32 19.... **CURRENT METER NOTES** TIME { BEGIN 3:20 P.M. END 3:40 P.M.

DIV. 1 DIST. 3

LARAMIE POUDRE RIVER AT TUNNEL OUTLET

GAGE HT. BEGINNING 1.85 FT. ENDING 1.87 FT. MEAN 1.86 FT. METER NO. 13

MEAS. C. E. McGRAW NOTES BY C. E. M.

Dist. from initial point	Depth	Depth of observat.	Revolutions	Time in seconds	VELOCITY At point	VELOCITY Mean in vertical	VELOCITY Mean in section	Area	Mean Depth	Width	Discharge
10.65	1.79	.6	80	43		4.18	✓	✓	✓	✓	✓
9.0	1.88	"	80	47		3.82	4.00	2.85	1.84	1.55	11.40
8.0	1.82	"	70	45		3.50	3.66	1.85		1'	6.77
7.0	1.55	"	80	40		4.48	3.99	1.68			6.70
6.0	1.57	"	100	44.5		5.02	4.75	1.56			7.41
5.0	1.40	"	90	41		4.92	4.97	1.48			7.36
4.0	1.12	"	70	41		3.83	4.38	1.26			5.52
3.0	1.12	"	100	43		5.19	4.51	1.12			5.05
2.0	1.18	"	90	43		4.69	4.94	1.15			5.68
1.0	1.35	"	80	43		4.18	4.44	1.26		1'	5.59
0.4	1.30	"	80	42		4.28	4.23	.79	1.32	.6'	3.34

FLUME CONSTRUCTION SEEMS O.K. GRAVEL ON ENTRANCE FLOOR AS SHOWN BY DEPTH IN ABOVE NOTES. REGISTER WORKING O.K.

FRANK ORRYAN - LA PORTE, COLO.

FROM STANDARD TABLE
G.H. 1.86 = DISC. 64.57

Totals ✓ 64.57

PLACE NOTES ON BACK OF SHEET

2525

DATE .. 19 CURRENT METER NOTES TIME (BEGIN) (END) 11:40

DIV. DIST.

Laramie Poudre trib RIVER AT Bridge above Lake

GAGE HT. BEGINNING 1.54 FT. ENDING FT. MEAN FT. METER NO. 12

MEAS. Whitten NOTES BY V.W. Whitten

Dist. from initial point	Depth	Depth of observat.	Revolutions	Time in seconds	VELOCITY: At point	VELOCITY: Mean in vertical	VELOCITY: Mean in section	Area	Mean Depth	Width	Discharge
0	0		0	0		0					
2	0.5		5	30		.40	.20	.5		2	.10
4	1.0		40	40		2.27	1.34	1.5			2.00
6	1.4		60	46		2.96	2.62	2.4			6.29
8	1.4		60	46		2.96	2.96	2.8			8.29
10	1.4		60	45		3.02	2.99	2.8			8.37
12	1.5		60	41		3.32	3.17	2.9			9.19
14	1.5		60	39		3.49	3.40	3.0			10.20
16	1.0		60	40		3.40	3.44	2.5		2	8.60
17	0.3		20	34		1.35	2.38	.65	.65	1	1.55
											54.59

NOTE
G.H. TAKEN FROM CHART
APPROX. 1.54
6' VENTURI

Totals											54.6

PLACE NOTES ON BACK OF SHEET

2526

DATE 8-14- 1937 **CURRENT METER NOTES** TIME BEGIN 3.20PM END

DIV. 1 DIST. 3

Laramie Poudre Tunnel RIVER, AT 6' Venturi

GAGE HT. BEGINNING 1.19 FT. ENDING 1.19 FT. MEAN 1.19 FT. METER NO. 19

MEAS. L. T. Burgess NOTES BY L. T. Burgess

Dist. from initial point	Depth	Depth of observat.	Revolutions	Time in seconds	VELOCITY At point	VELOCITY Mean in vertical	VELOCITY Mean in section	Area	Mean Depth	Width	Discharge
0 4	1.20	0.6	90	56		3.71					
1	1.19		90	57		3.65	3.68	0.71	1.20	0.6	2.65
2	1.19		90	60		3.47	3.56	1.19	1.19	1	4.24
3	1.19		90	55		3.74	3.60	1.19		1	4.28
4	1.20		90	55		3.78	3.76	1.20		1	4.51
5	1.20		80	54		3.43	3.60	1.20		1	4.32
6	1.20		80	54		3.43	3.43	1.20		1	4.12
7	1.21		70	54		3.01	3.22	1.20		1	3.86
7.6	1.21		70	53		2.44	2.72	0.73	1.21	0.6	1.06
											30.04

Flume clean 25' above point of measurement.

G.H. 1.19 = 31.68 c.f.s. by Table

30.04

1.64

Flume 3% Short.

Unable to get in to automatic gage as have no key & can't find attendant Sunday

Totals

PLACE NOTES ON BACK OF SHEET

2527

ENGINEERING DEPARTMENT

DATE 9-5 1937 **CURRENT METER NOTES** TIME BEGIN ..... END 6-30

DIV. 1 DIST. 3

LARAMIE POUDRE RIVER, AT 6' VENTURI

GAGE HT. BEGINNING .90 FT. ENDING .90 FT. MEAN 0.90 FT. METER NO. 12

MEAS. White NOTES BY J.L. SAMPLES

Dist. from initial point	Depth	Depth of observat.	Revolutions	Time in seconds	VELOCITY: At point	VELOCITY: Mean in vertical	VELOCITY: Mean in section	Area ✓	Mean Depth	Width	Discharge ✓
0	.92		50	44		2.46					
1	.92		50	42		2.58	2.52	.92		1	2.32
2	.92		60	43		3.16	2.87	.92			2.64
3	.92		60	41		3.32	3.24	.92			2.98
4	.92		60	44		3.09	3.20	.92			2.94
5	.92		60	44		3.09	3.09	.92			2.84
6	.92		50	41		2.64	2.86	.92			2.63
7.3	.92		50	41		2.64	2.64	1.20	.92	1.3	3.17
										✓	19.52
		TABLE DISCHG.						20.29			
		MEAS. "						19.52			
		DIFF						.77			
		38% ERROR									

Totals

PLACE NOTES ON BACK OF SHEET

2528

182

DIV. 1 DIST. 3

LARAMIE POUD TRIBUTARY AT LA VENT

GAGE HT. BEGINNING 0.64 FT. ENDING 0.64 FT. MEAN 0.64 FT. METER NO. 12

MEAS. W. Bithell NOTES BY W. Bithell

Dist. from initial point	Depth	Depth of observ.	Revolutions	Time in seconds	VELOCITY: At point	VELOCITY: Mean in vertical	VELOCITY: Mean in section	Area	Mean Depth	Width	Discharge
0	0.70		40	39		2.33					
1	.70		40	38		2.39	2.36	.70		1	1.65
2	.70		40	37		2.45	2.42	.70			1.69
3	.70		40	37		2.45	2.45	.70			1.72
4	.70		40	38		2.39	2.42	.70			1.69
5	.70		40	40		2.27	2.33	.70			1.63
6	.70		40	41		2.21	2.24	.70		1	1.57
7.2	.70		40	43		2.11	2.16	.84		1.2	1.81
											11.76
Totals											

PLACE NOTES ON BACK OF SHEET

2529

STATE OF COLORADO
ENGINEERING DEPARTMENT
CURRENT METER NOTES

DATE May 24 1927 TIME BEGIN 5-30 PM END 6-22

DIV. 1 DIST. 3

Larimie Poudre Tunnel RIVER, AT Venturi

GAGE HT. BEGINNING 1.08 FT. ENDING 1.08 FT. MEAN 1.08 FT. METER NO.

MEAS. NOTES BY L. D. Parker

Dist. from initial point	Depth	Depth of observat.	Revolutions	Time in seconds	VELOCITY: At point	VELOCITY: Mean in vertical	VELOCITY: Mean in section	Area	Mean Depth	Width	Discharge
0.0	1.08	0.2	30	48	1.37						
0.0		0.8	30	39		1.68	1.79	1.08	1.08	1.0	1.93
1	1.08	0.2	30	35	1.91	1.86					
1		0.8	30	31		2.06	2.16	1.08	1.08	1.0	2.33
2	1.08	0.2	40	36	2.37	2.41					
2		0.8	40	37		2.34	2.43	1.06	1.06	1.0	2.58
3	1.05	0.2	40	36	2.50	2.41					
3		0.8	40	33½		2.58	2.54	1.05	1.05	1.0	2.67
4	1.05	0.2	40	35	2.59	2.47					
4		0.8	40	32		2.71	2.59	1.05	1.05	1.0	2.72
5	1.05	0.2	40	35	2.59	2.47					
5		0.8	40	32		2.71	2.53	1.05	1.05	1.0	2.65
6	1.05	0.2	40	37	2.48	2.34					
6		0.8	40	33		2.62	2.46	1.05	1.05	1.0	2.58
7	1.05	0.2	40	36	2.44	2.41					
7		0.8	40	35		2.47	2.46	1.05	1.05	1.0	2.58
8	1.05	0.2	40	35	2.47	2.47					
8		0.8	40	35		2.47	2.46	.19	1.05	.18	.47
1.18					2.46						20.51

Dif. in the two measurements by .6 and .8 methods = 2.2 %

= 2.098 - 20.51 = 0.473 f.

PLACE NOTES ON BACK OF SHEET

COMP. EXH. No. 60

Laramie-Poudre Tunnel

Improved Venturi Flume at East Portal
Width of Throat 6 feet

Comparative Table of Check Current Meter Measurements by State Engineer's Office of Colorado and Recorded Flows of Venturi Flume

Compiled from records on file in State Engineer's Office, Denver, by R. I. Meeker, Irrigation Engineer, April, 1933

Current meter measurements taken as base reco[illegible]

Year	Date	Hydrographer	Chart gage height feet	Metered discharge sec. ft.	Venturi table disc. sec. ft.	Error in recorded flow	
						Difference sec. ft.	%
1927	May 24	M. C. Hinderlider	1.08	20.51	27.13	+6.62	+32
	May 24	M. C. Hinderlider	1.08	20.98	27.13	+6.15	+29
	May 25	M. C. Hinderlider	0.68	8.33	12.98	+4.65	+56
1928	Sept. 26	J. H. Baily	0.62	11.86	11.20	−0.66	− 5.6
1929	Aug. 3	J. H. Baily	0.53	9.65	8.72	−0.93	− 9.6
1930	May 20	J. H. Baily	0.65	13.16	12.08	−1.08	− 8.2
	July 4	J. H. Baily	0.59	11.50	10.35	−1.15	−10
	Aug. 5	J. H. Baily	0.46	7.28	6.96	−0.32	− 4.4
1931							
1932	July	M. C. Hinderlider R. L. Parshall	*1.11	34.68	28.35	−6.33	−18
	June 18	C. E. McGraw	1.87	64.82	65.13	+0.31	+ 0.005
	July 15	Whitten	1.54	54.59	47.79	−6.80	−12.5
	Aug. 15	L. T. Burgess	1.21	30.04	32.53	+2.49	+ 8.3
	Sept. 5	Whitten	0.91	19.52	20.65	+1.13	+ 5.8
	Sept. 22	Whitten	0.67	11.76	12.68	+0.92	+ 7.8

* Staff gage.

The above table has been prepared to show the disagreement in diversion quantities from Laramie River as measured by current meter and as registered by automatic gage charts using Venturi tables to determine discharge. The Venturi records are at wide variance with the current meter discharges due to conditions at flume.

COMPLAINANT'S EXHIBIT 64

STATE OF COLORADO Engineering Department

Daily gage height, in feet, and discharge, in second-feet, of SAND CREEK DITCH River at RATING FLUME for year ending September 30, 1951.

Day	APR. Gage Height	APR. Discharge	MAY Gage Height	MAY Discharge	JUNE Gage Height	JUNE Discharge	JULY Gage Height	JULY Discharge	AUG. Gage Height	AUG. Discharge	SEPT. Gage Height	SEPT. Discharge
1					165	69						
2					169	53						
3					155	58						
4					160	62						
5					170	71						
6					155	58						
7					140	47						
8					131	41						
9					153	56						
10					151	55						
11					186	84						
12					127	38						
13					120	34						
14					108	26						
15					100	22						
16			150	54	087	18						
17			129	79	086	16						
18			139	46	078	12						
19			099	22	069	10						
20			075	12	061	8						
21			069	10	057	7						
22			067	10	053	6						
23			135	44	051	5						
24			167	68	050	5						
25			158	61	044	4						
26			155	58	047	4						
27			137	45	042	3						
28			126	39	040	3						
29			127	38								
30			121	34								
31			136	44								
			664		855							
			21.4		28.5							
			1320		1700							

COMPLAINANT'S EXHIBIT 65

2536

STATE OF COLORADO

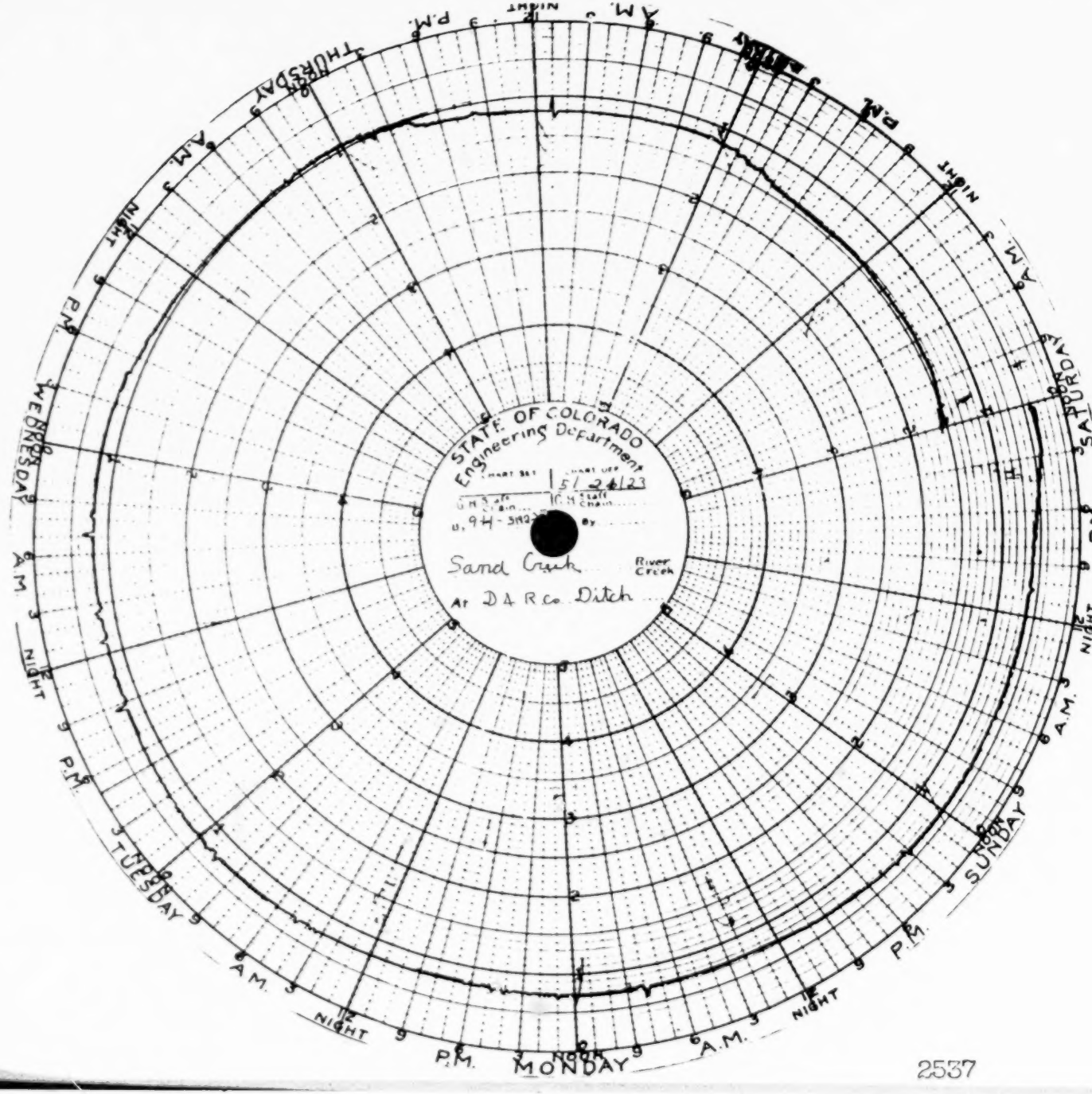
Engineering Department

Daily gage height, in feet, and discharge, in second-feet, of SAND CREEK DITCH (OR BOX SCRAPER DITCH) River at RATING FLUME for year ending September 30, 1932.

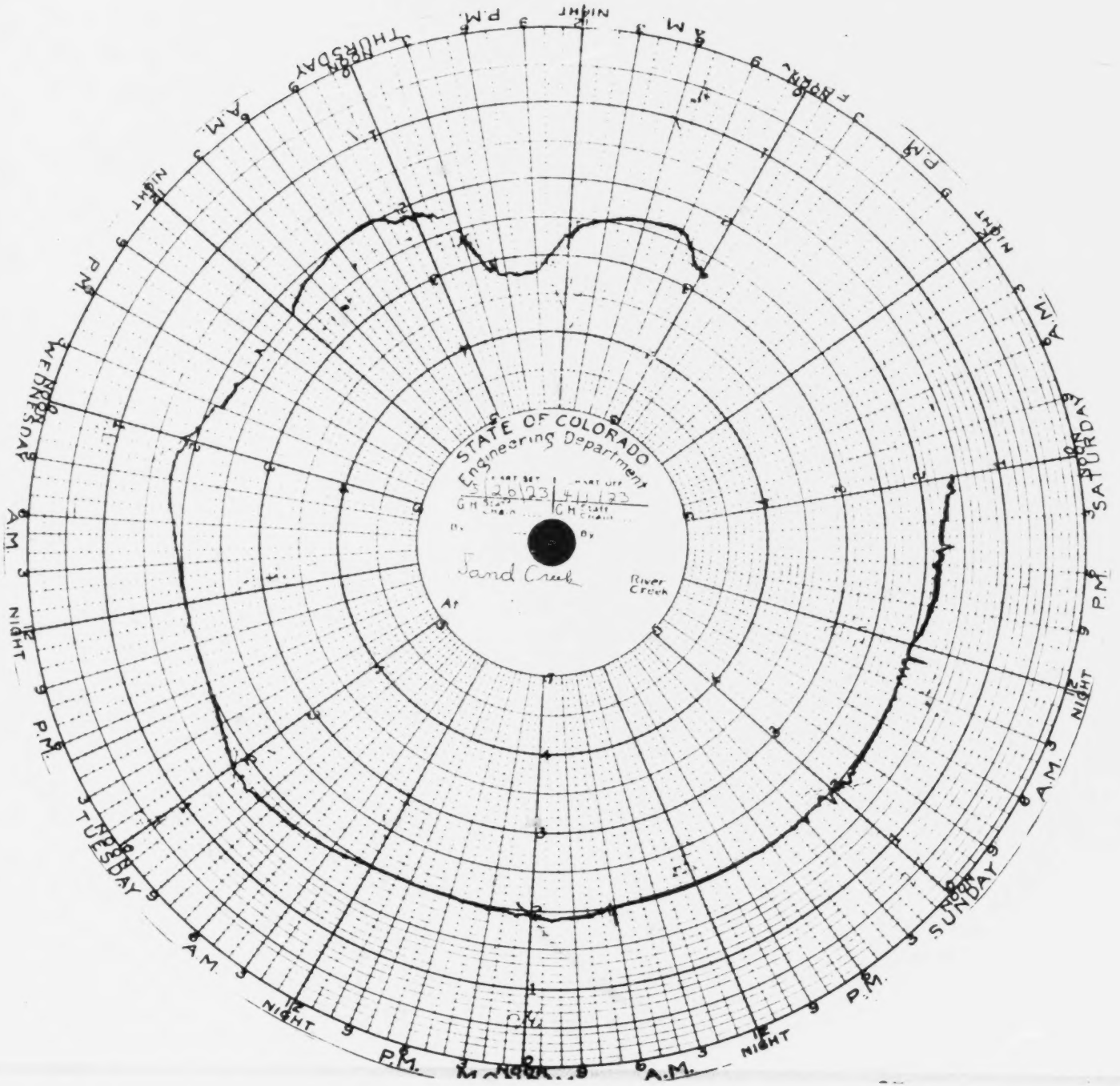
Day	OCT. Gage height	OCT. Discharge	NOV. Gage height	NOV. Discharge	DEC. Gage height	DEC. Discharge	JAN. Gage height	JAN. Discharge	FEB. Gage height	FEB. Discharge	MAR. Gage hgt.	MAR. Dis. Mgt	Day	APR. Gage height	APR. Discharge	MAY Gage height	MAY Discharge	JUNE Gage height	JUNE Discharge	JULY Gage height	JULY Discharge	AUG. Gage height	AUG. Discharge	SEPT. Gage height	SEPT. Discharge
1													16					1.96	95	.078	13				
2													17					1.92	91	.090	18				
3													18					2.02	101	.096	21				
4													19					2.13	113	.065	9				
5													20					2.20	121	.057	7				
6													21					2.19	120	.053	6				
7													22					2.30	132	.043	4				
8													23					2.24	125	.033	2				
9													24					2.20	121	.028	1				
10													25					2.10	110	.025	1				
11													26					2.07	107						
12													27					2.02	101						
13													28					2.04	103						
14													29					2.07	107						
15													30					2.17	118						
16													31					2.08	108						
17													1			1.14	30	1.95	94						
18													2			1.32	41	1.82	82						
19													3			1.44	53	1.72	73						
20													4			1.86	85	1.91	90						
21													5			2.09	109	1.56	57						
22													6			2.61	169	1.42	48						
23													7			2.36	139	1.32	41						
24													8			2.16	117	1.26	37						
25													9			1.97	96	1.17	32						
26													10			1.70	71	1.11	28						
27													11			1.54	57	1.19	33						
28													12			1.53	58	1.10	28						
29													13			1.94	94	1.93	19						
30													14			2.08	108	1.81	14						
31													15			2.01	100								
																1327		2449		82					
																42.8		81.6		2.64					
																2630		4860		162					

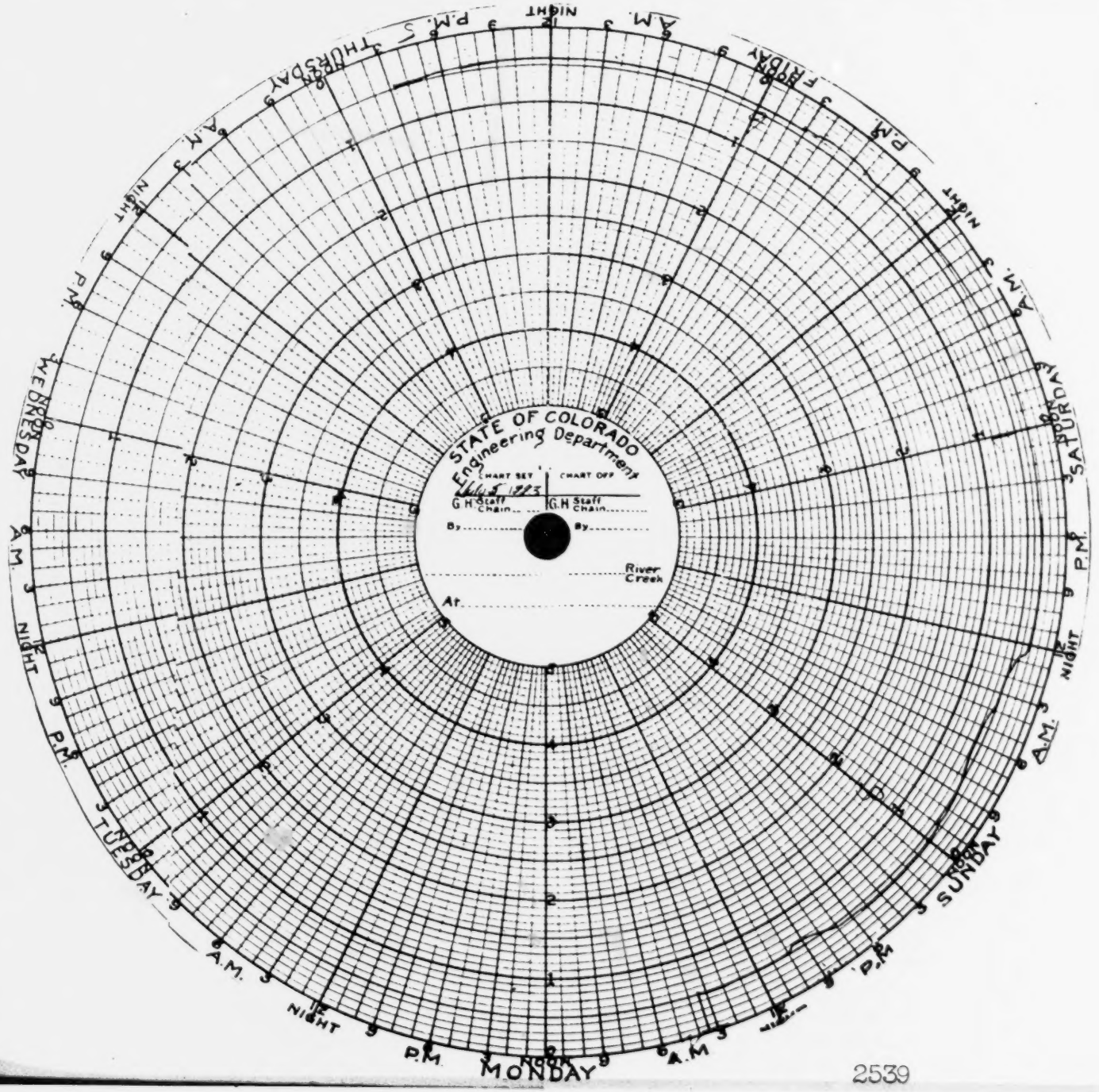
1st 4th 2nd 3rd 4th Quarter 1st 2nd 3rd 4th Year period

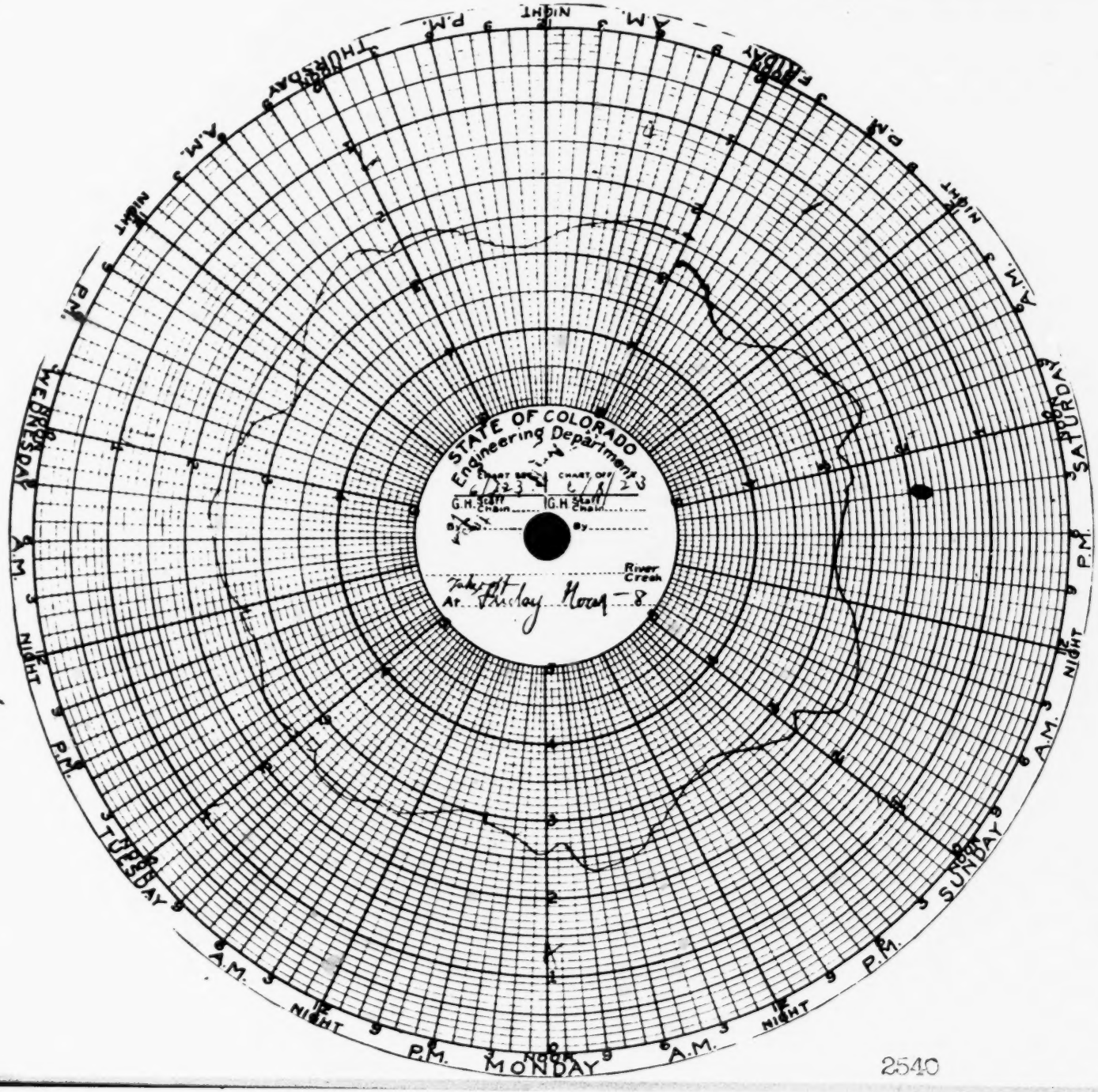
2-18-33 2-17-33 2-17-33 2-17-33


STATE OF COLORADO
Engineering Department
5/26/23
Sand Creek
At D & R Co. Ditch
River
Creek
MONDAY
TUESDAY
WEDNESDAY
THURSDAY
SATURDAY
SUNDAY
NIGHT
A.M.
P.M.
NOON

COMPLAINANT'S EXHIBIT 66--2




STATE OF COLORADO
Engineering Department
CHART SET
CHART OFF
July 5 1923
G.H. Staff Chain
G.H. Staff Chain
By
By
River
Creek
At
MONDAY
TUESDAY
WEDNESDAY
THURSDAY
FRIDAY
SATURDAY
SUNDAY
NIGHT
A.M.
P.M.

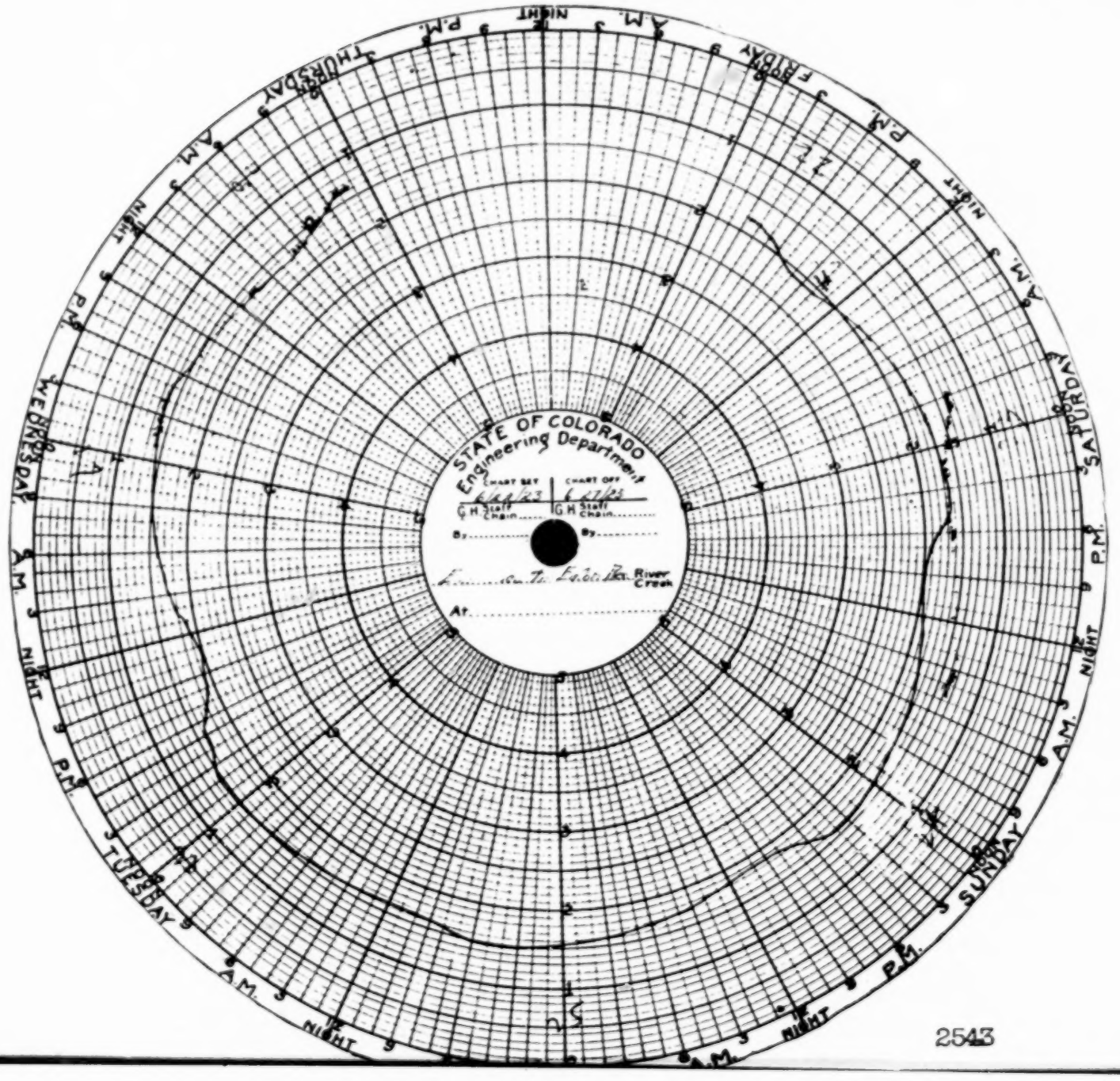

STATE OF COLORADO
Engineering Department
CHART SET
CHART OFF
G.H. Staff Chain
G.H. Staff Chain
By
By
River Creek
At Friday Noon - 8
MONDAY
TUESDAY
WEDNESDAY
THURSDAY
FRIDAY
SATURDAY
SUNDAY
NIGHT
A.M.
P.M.
NOON

2540

COMPLAINANT'S EXHIBIT 68-5

COMPLAINANT'S EXHIBIT 68-6

COMPLAINANT'S EXHIBIT 66-7



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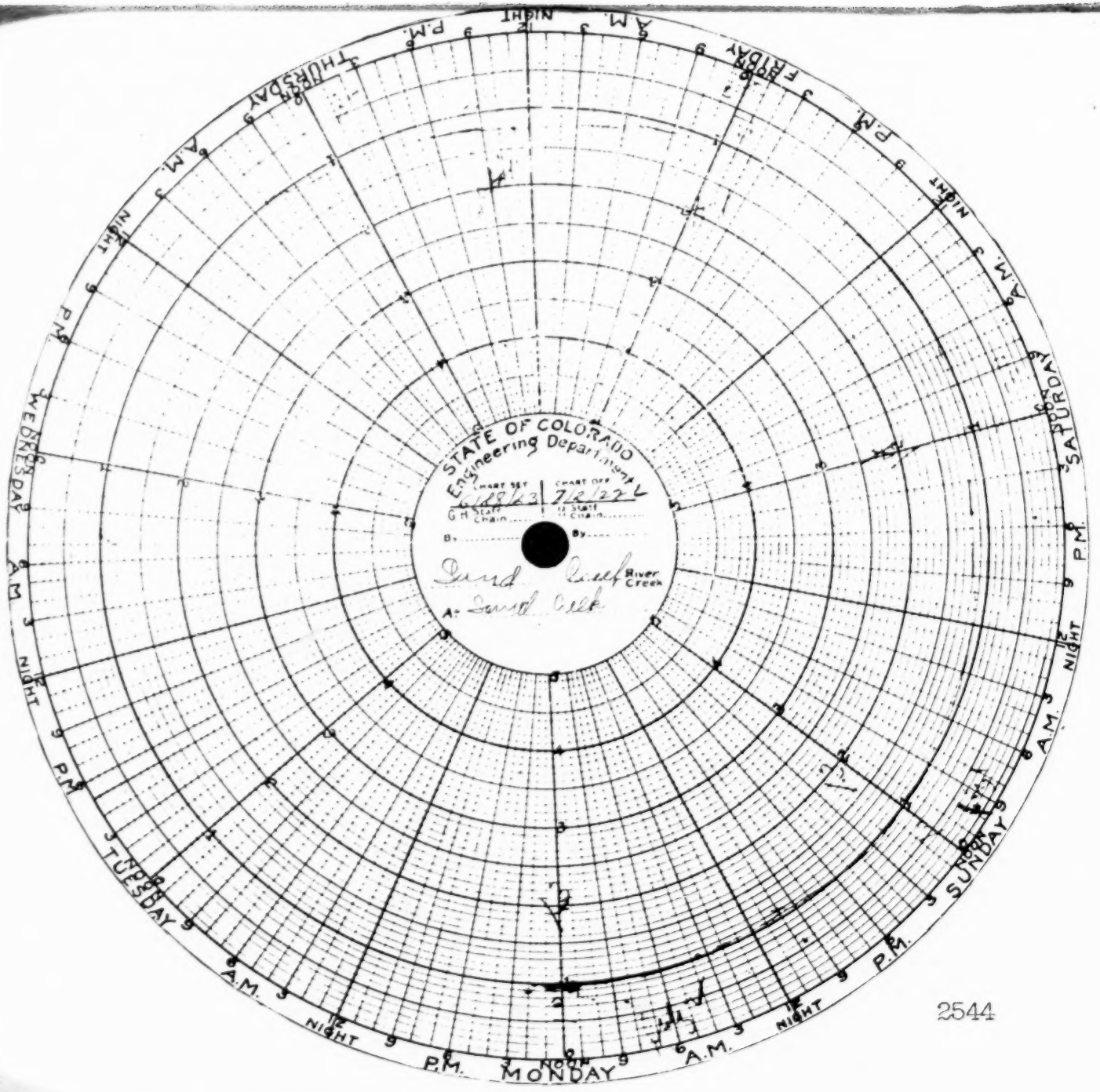
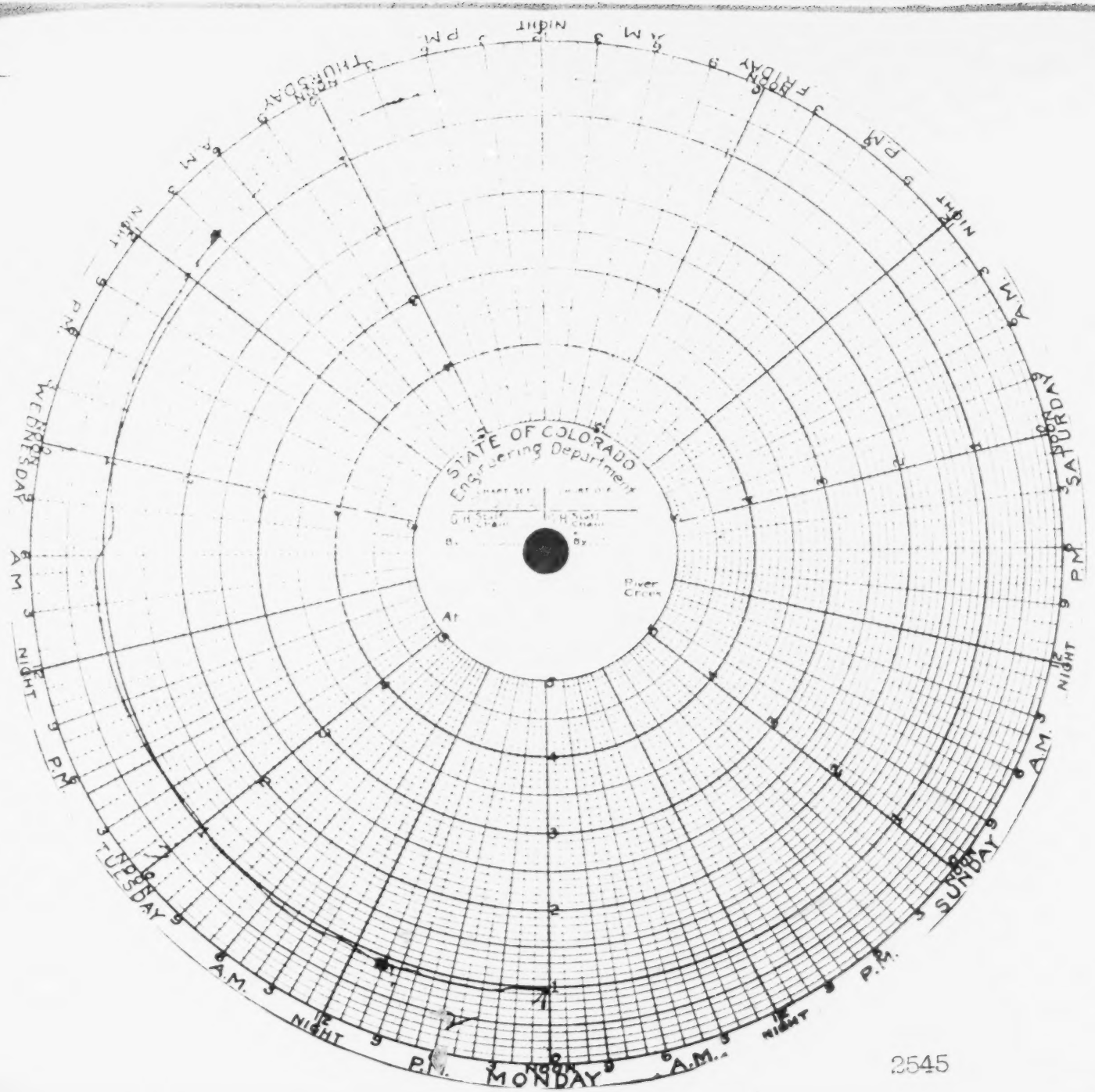
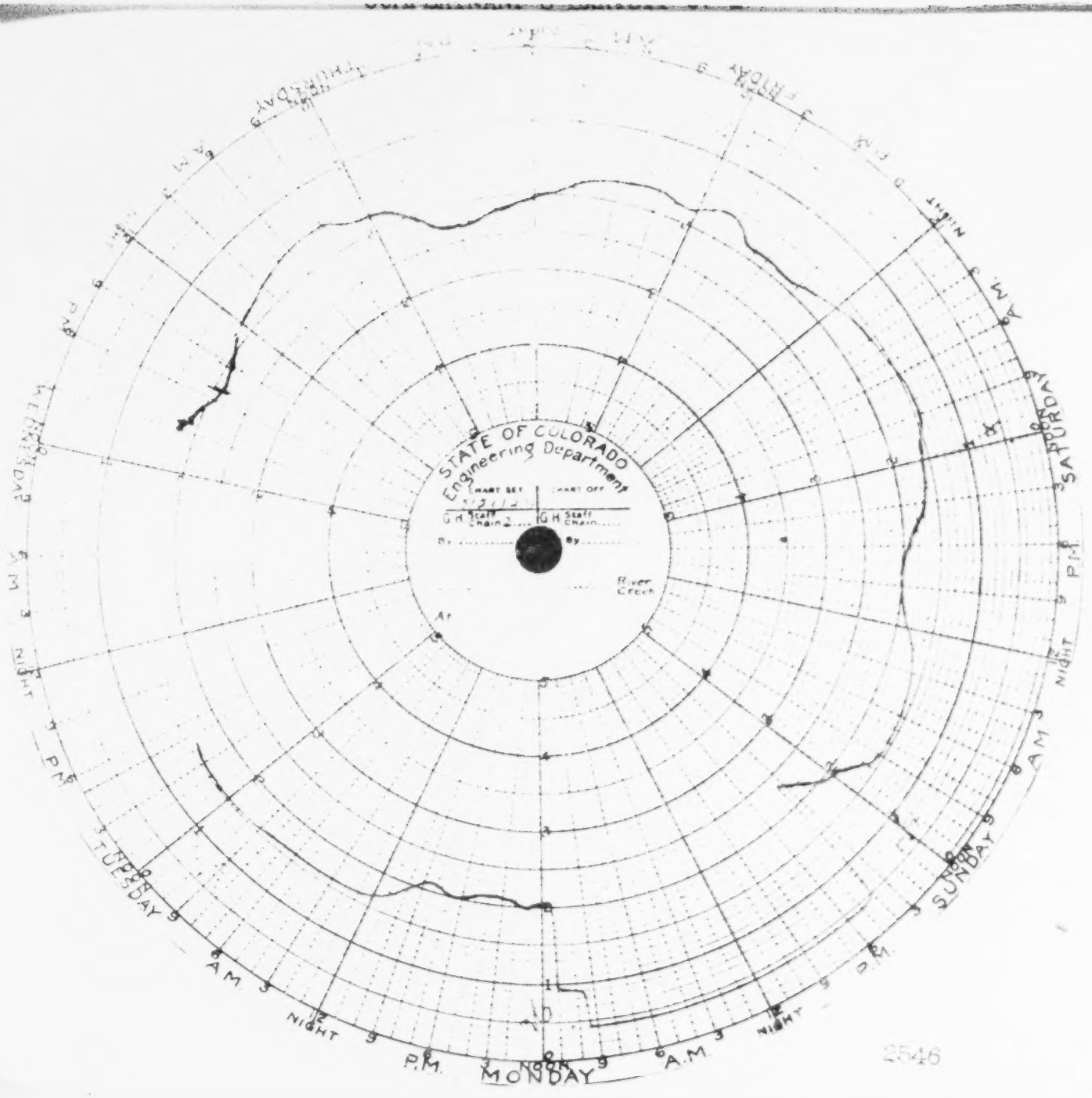

STATE OF COLORADO
Engineering Department
CHART SET
CHART OFF
G.H. Staff Chain
By
River Creek
At
NIGHT
P.M.
A.M.
NOON
THURSDAY
FRIDAY
SATURDAY
SUNDAY
MONDAY
TUESDAY
WEDNESDAY

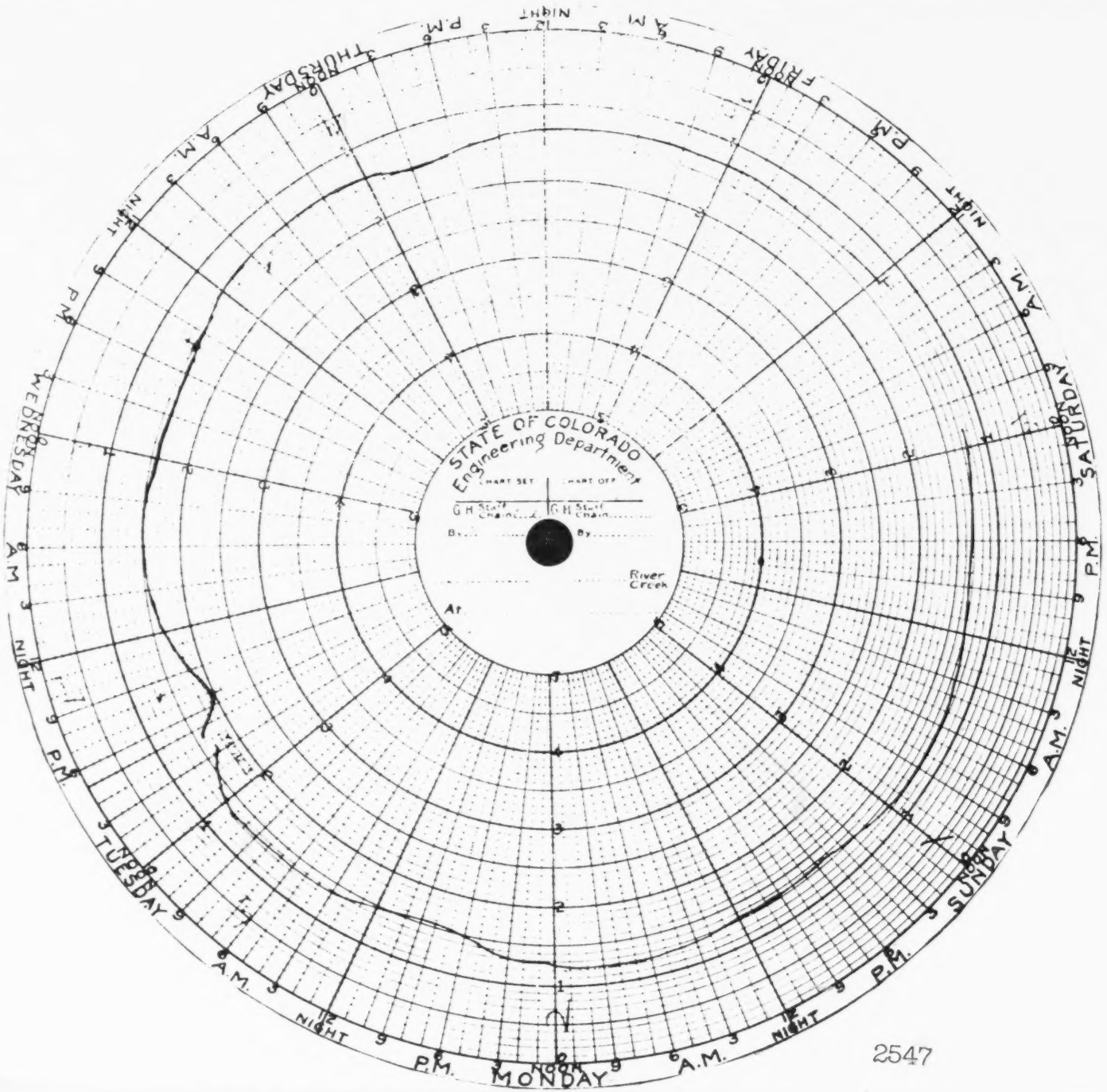
2544


STATE OF COLORADO
Engineering Department
River
Creek
At
MONDAY
TUESDAY
WEDNESDAY
THURSDAY
FRIDAY
SATURDAY
SUNDAY
NIGHT
A.M.
P.M.

2545


STATE OF COLORADO
Engineering Department
CHART SET
CHART OFF
G H Staff Chain
G H Staff Chain
By
By
River
Creek
At
MONDAY
TUESDAY
WEDNESDAY
THURSDAY
FRIDAY
SATURDAY
SUNDAY
NIGHT
A.M.
P.M.
NOON
MIDNIGHT

2546


STATE OF COLORADO
Engineering Department
CHART SET
CHART OFF
G.H. Staff Chain
G.H. Staff Chain
By
By
River Creek
At
MONDAY
TUESDAY
WEDNESDAY
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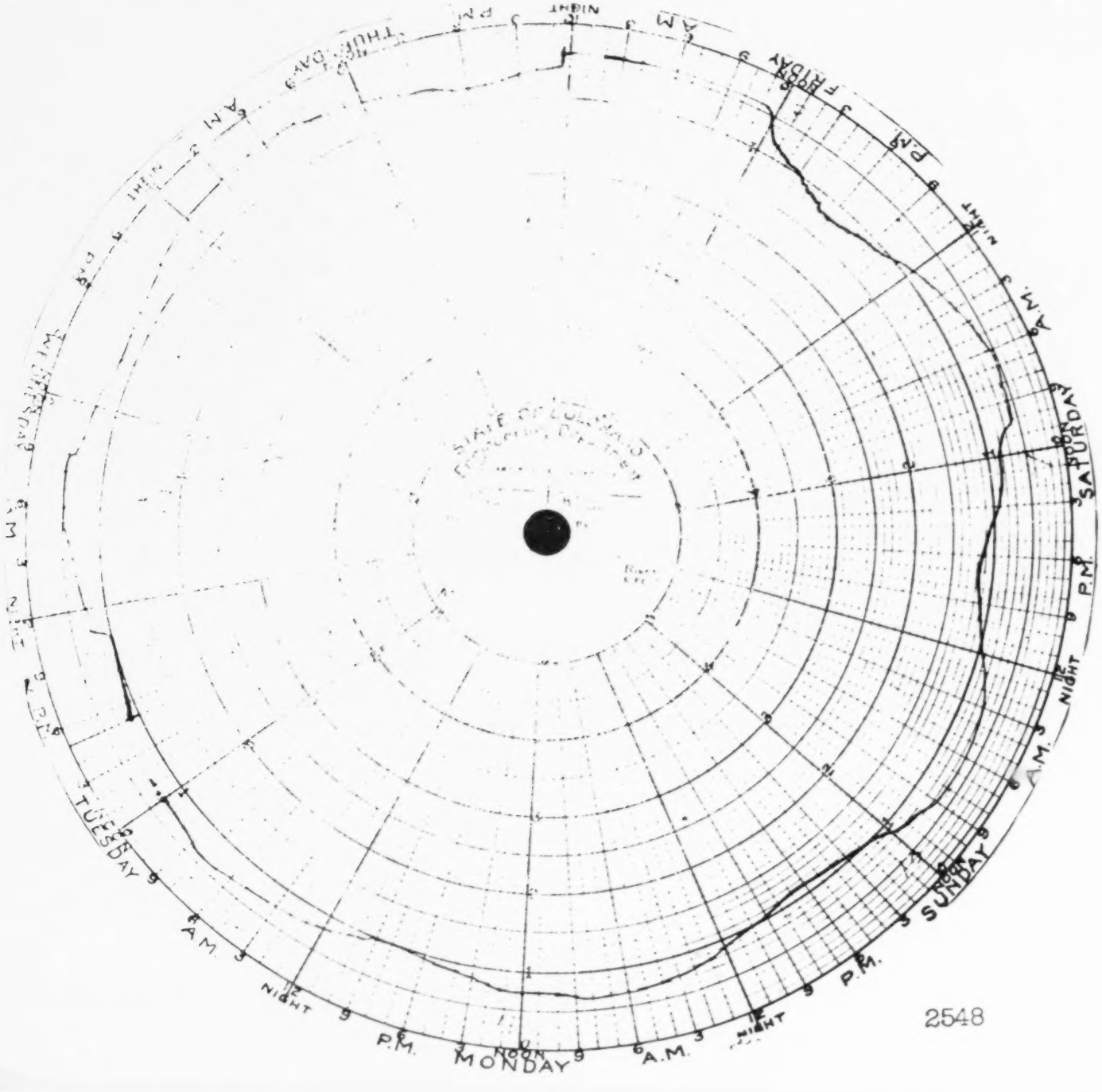
A.M.
P.M.

2547


MONDAY
TUESDAY
SUNDAY
SATURDAY
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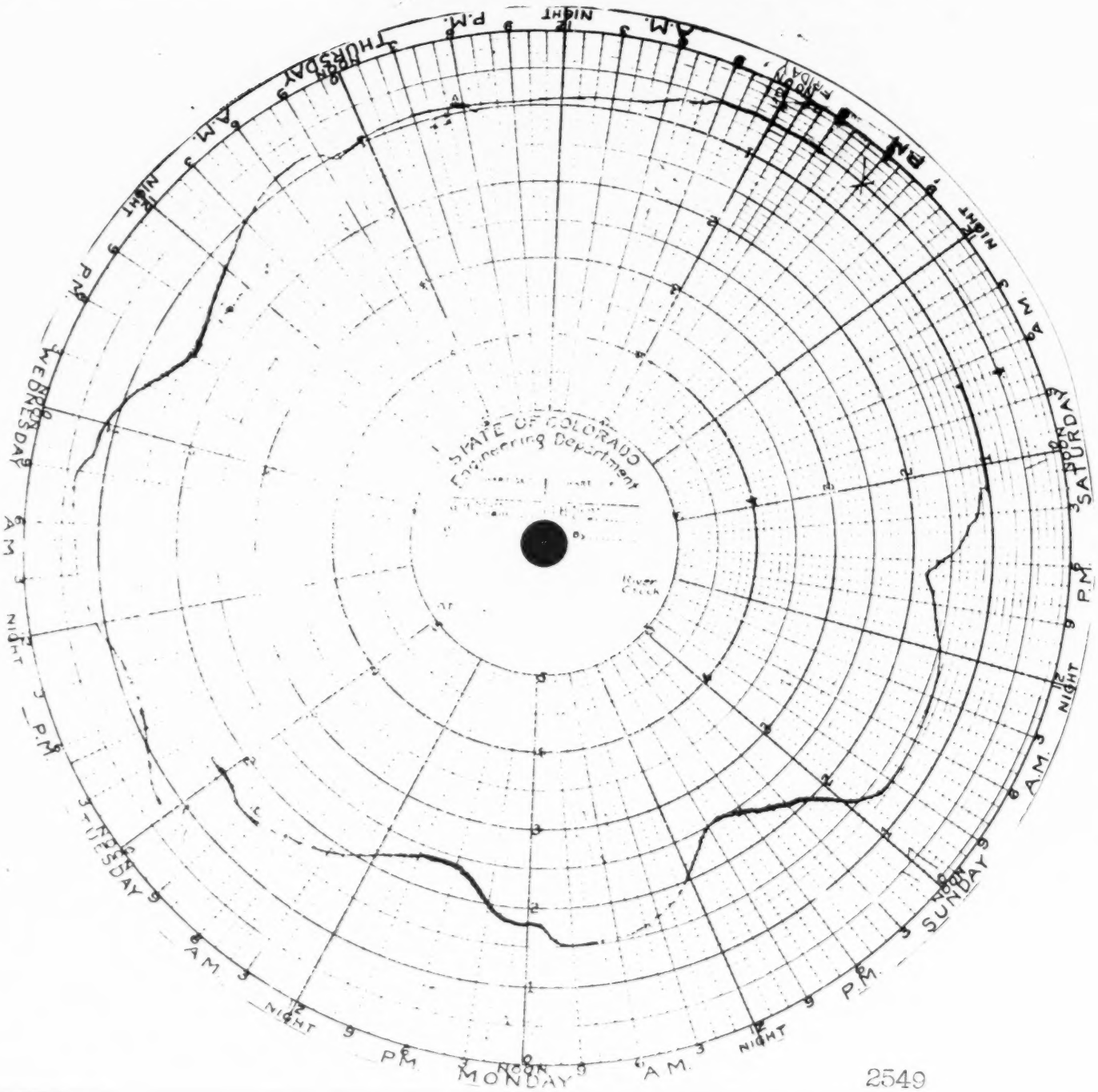
NIGHT
A.M.
P.M.
NOON
2548

COMPLAINANT'S EXHIBIT 68-1



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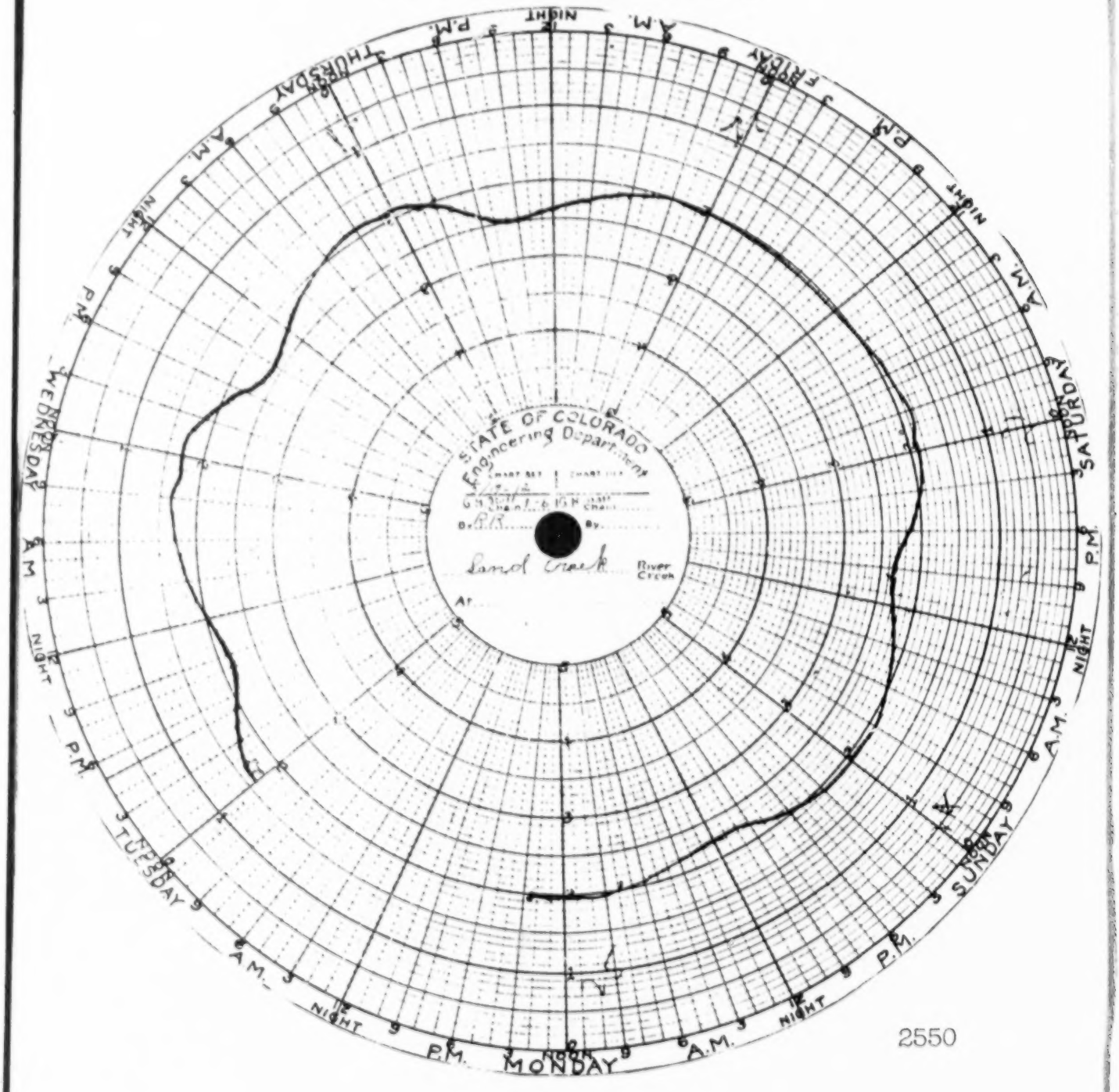

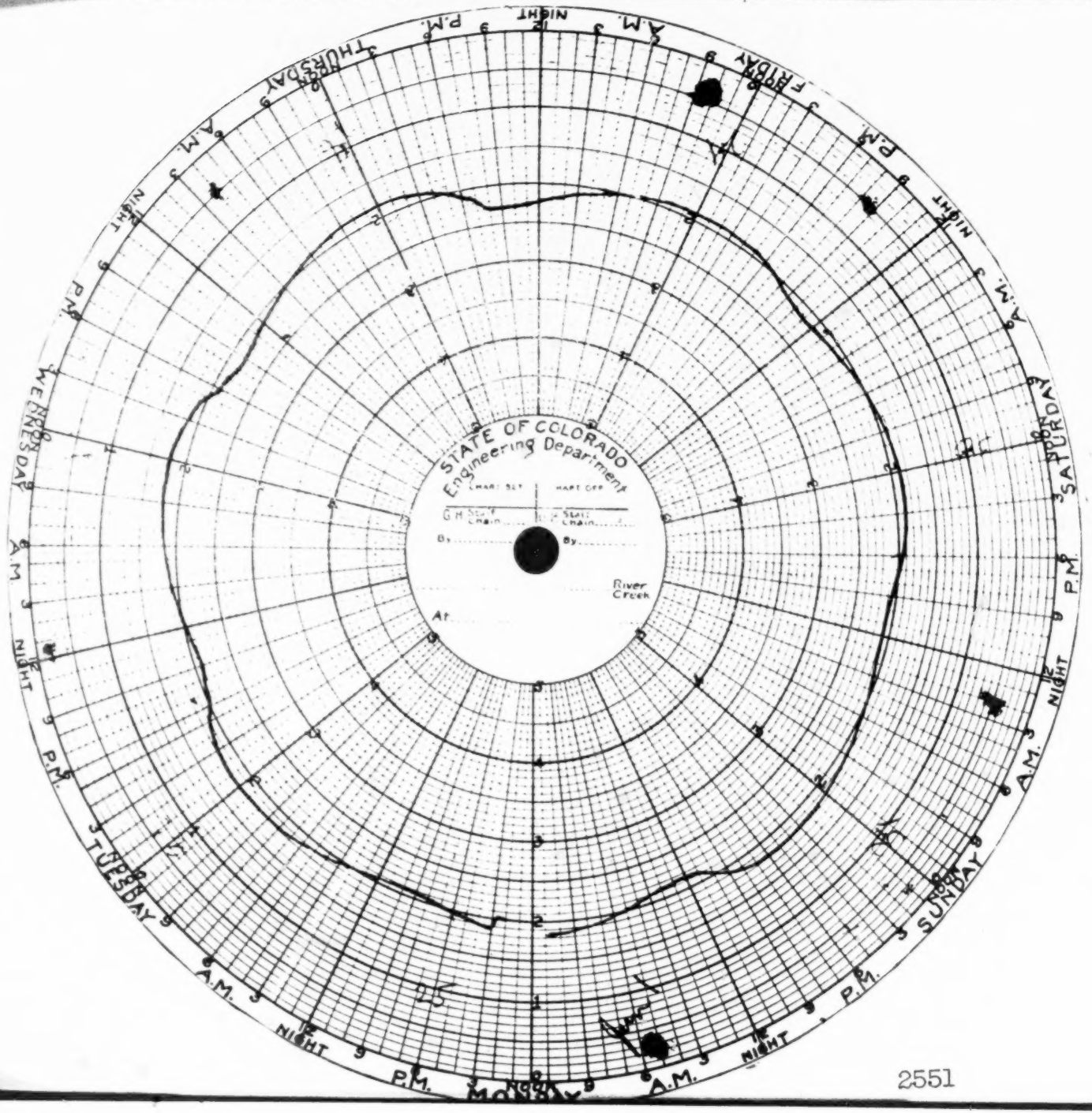
STATE OF COLORADO
Engineering Department
River
Creek
At
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FRIDAY
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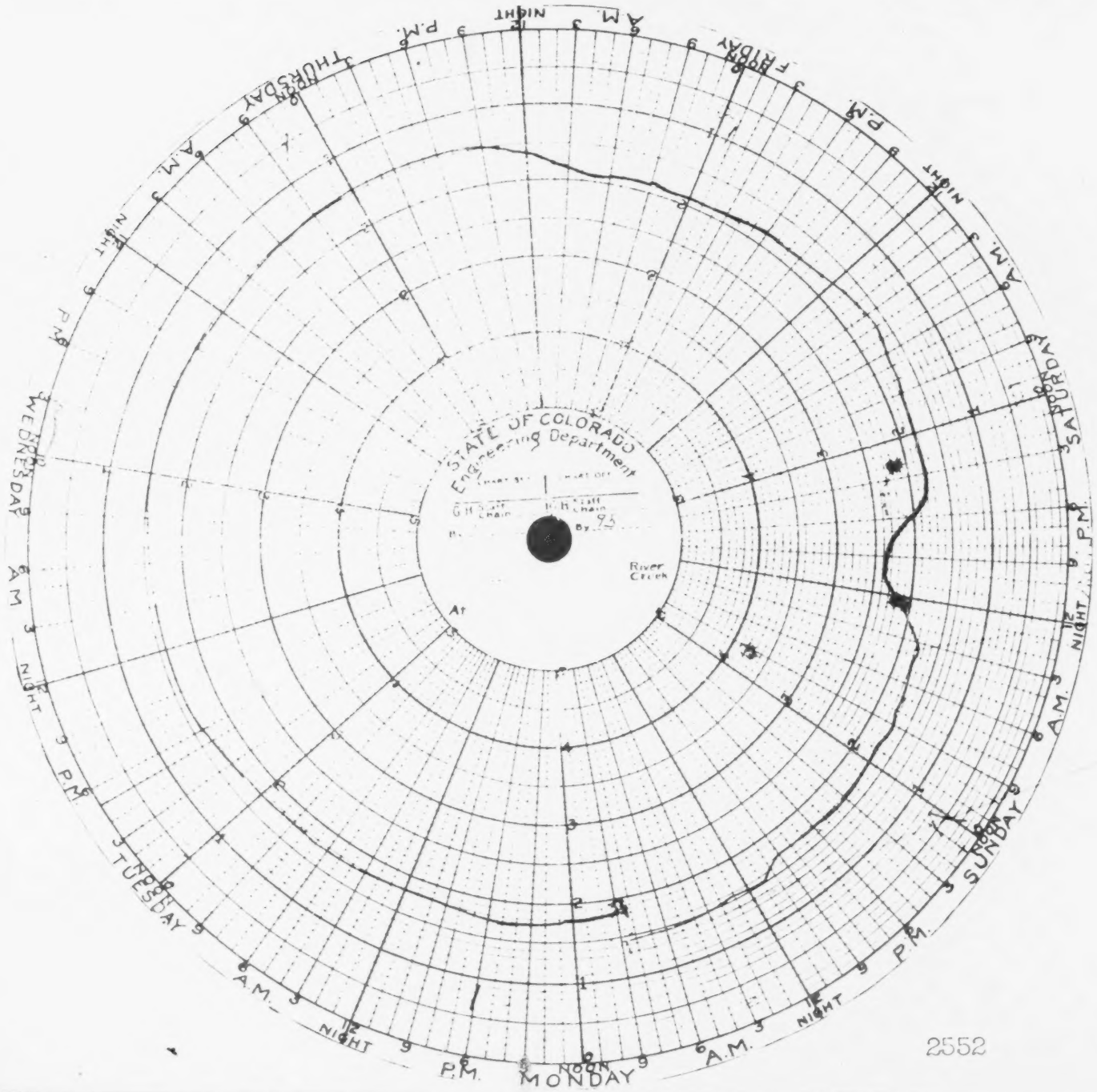
SUNDAY
NIGHT
A.M.
P.M.


STATE OF COLORADO
Engineering Department
River
Creek
At
MONDAY
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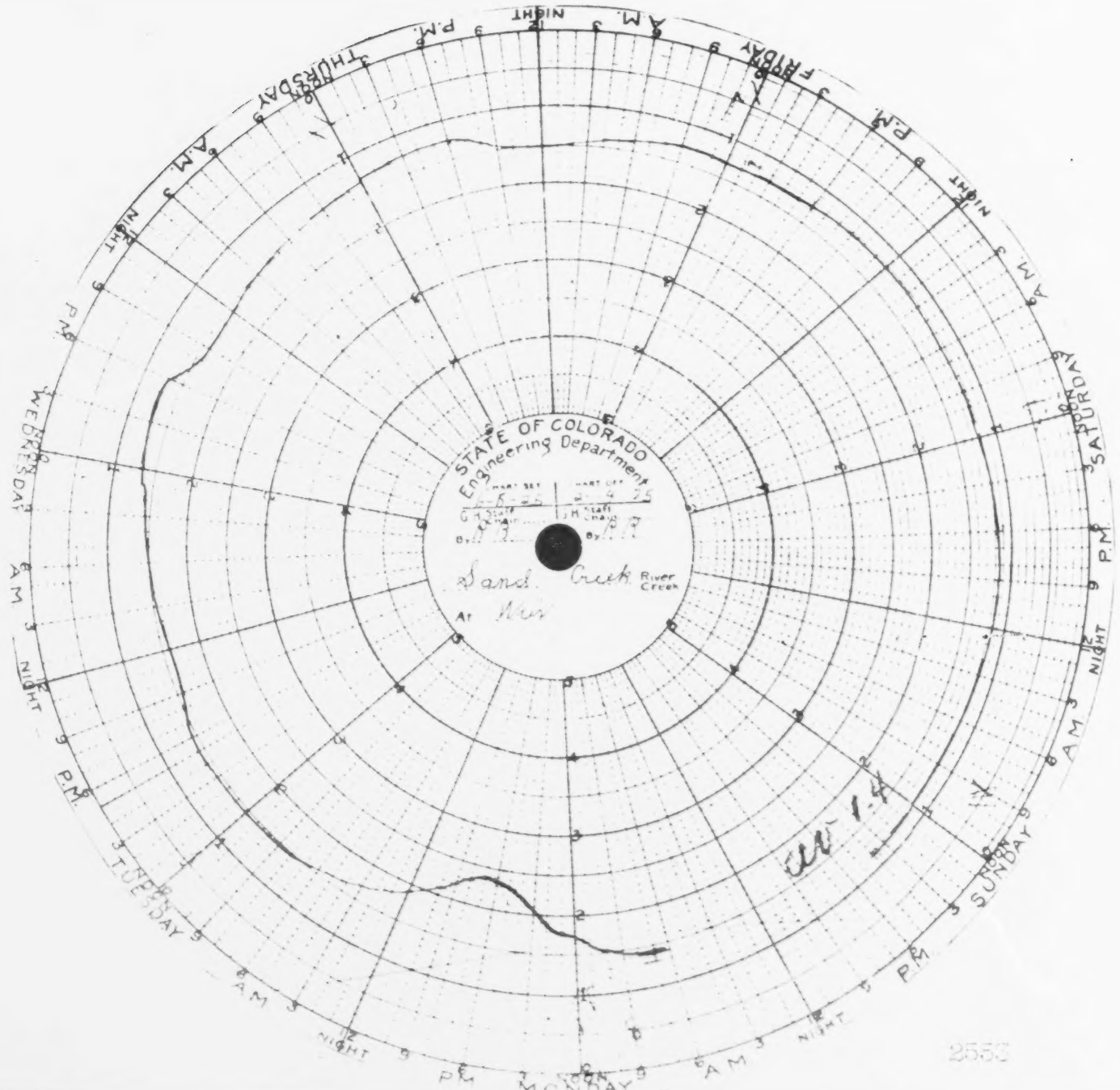
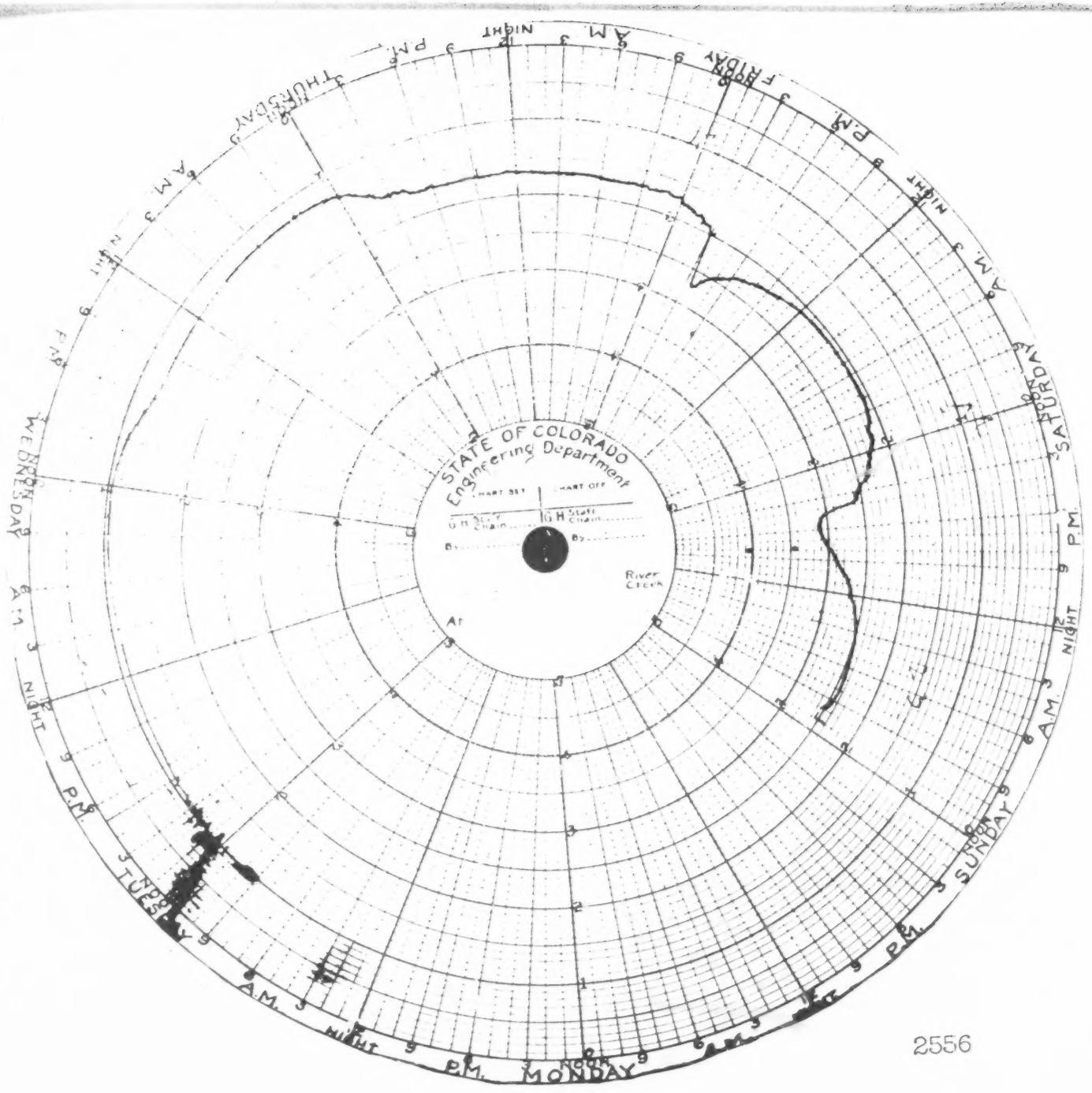
A.M.
P.M.

COMPLAINANT'S EXHIBIT 68-5



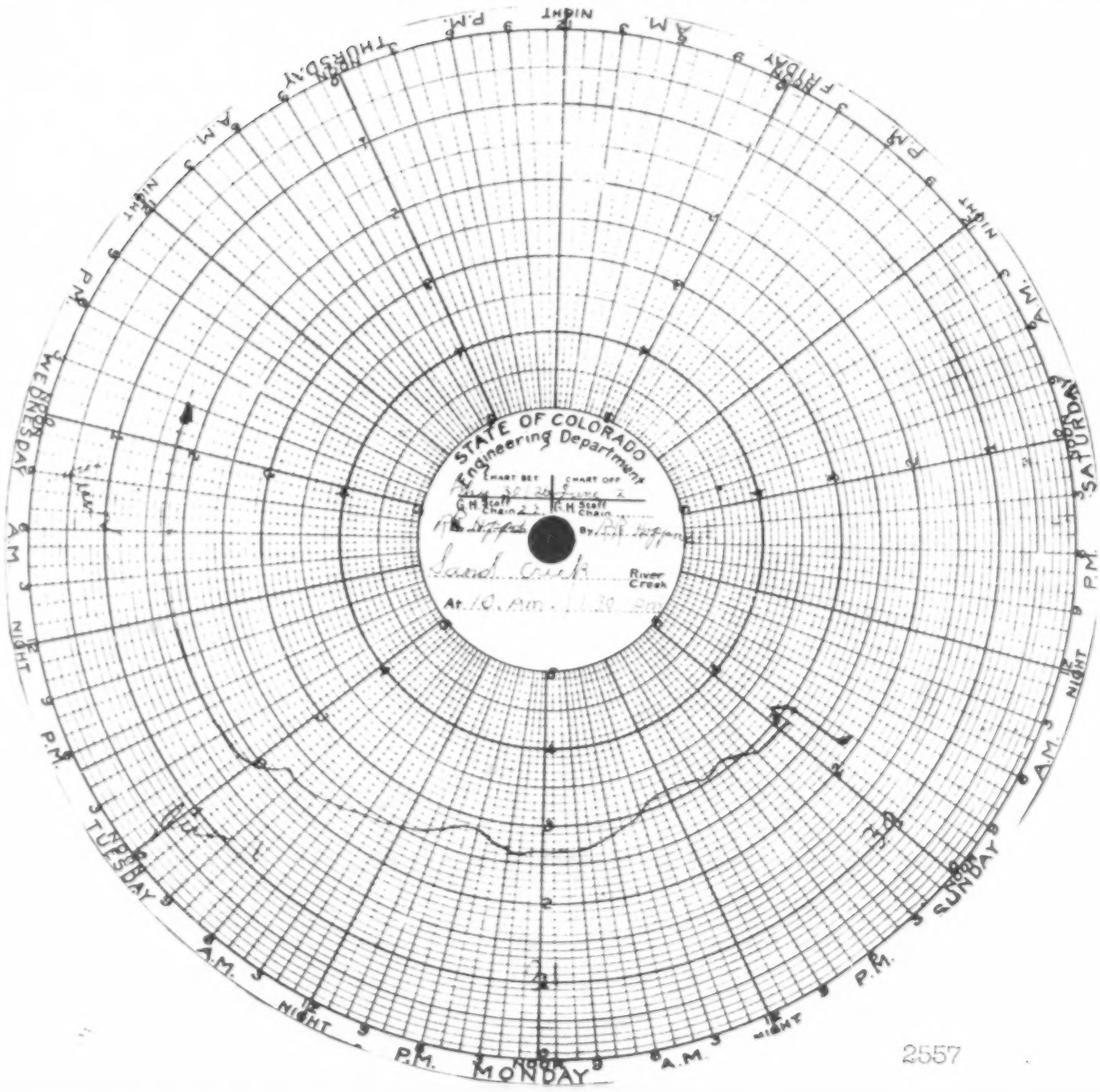
STATE OF COLORADO
Engineering Department
River
Creek
Sand
SATURDAY
SUNDAY
MONDAY
TUESDAY
WEDNESDAY
THURSDAY
FRIDAY
NIGHT
A.M.
P.M.
NOON

COMPLAINANT'S EXHIBIT 69


STATE OF COLORADO
Engineering Department
River
Creek
At
MONDAY
TUESDAY
WEDNESDAY
THURSDAY
FRIDAY
SATURDAY
SUNDAY
NIGHT
A.M.
P.M.

2556

COMPLAINANT'S EXHIBIT 69-2



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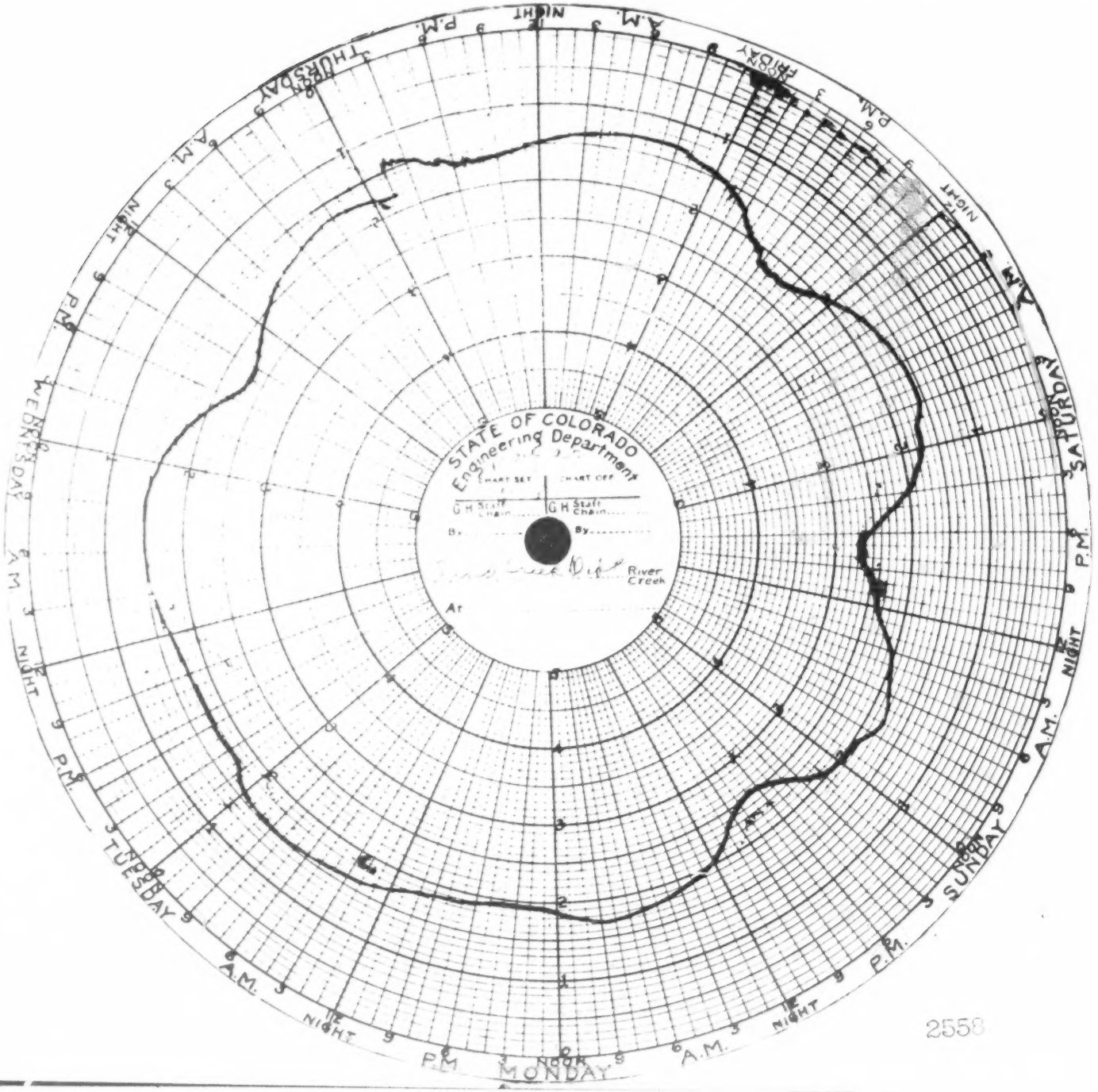
COMPLAINANT'S EXHIBIT 70



STATE OF COLORADO
Engineering Department
Sand Creek
River
Creek
At
MONDAY
TUESDAY
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THURSDAY
FRIDAY
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SUNDAY
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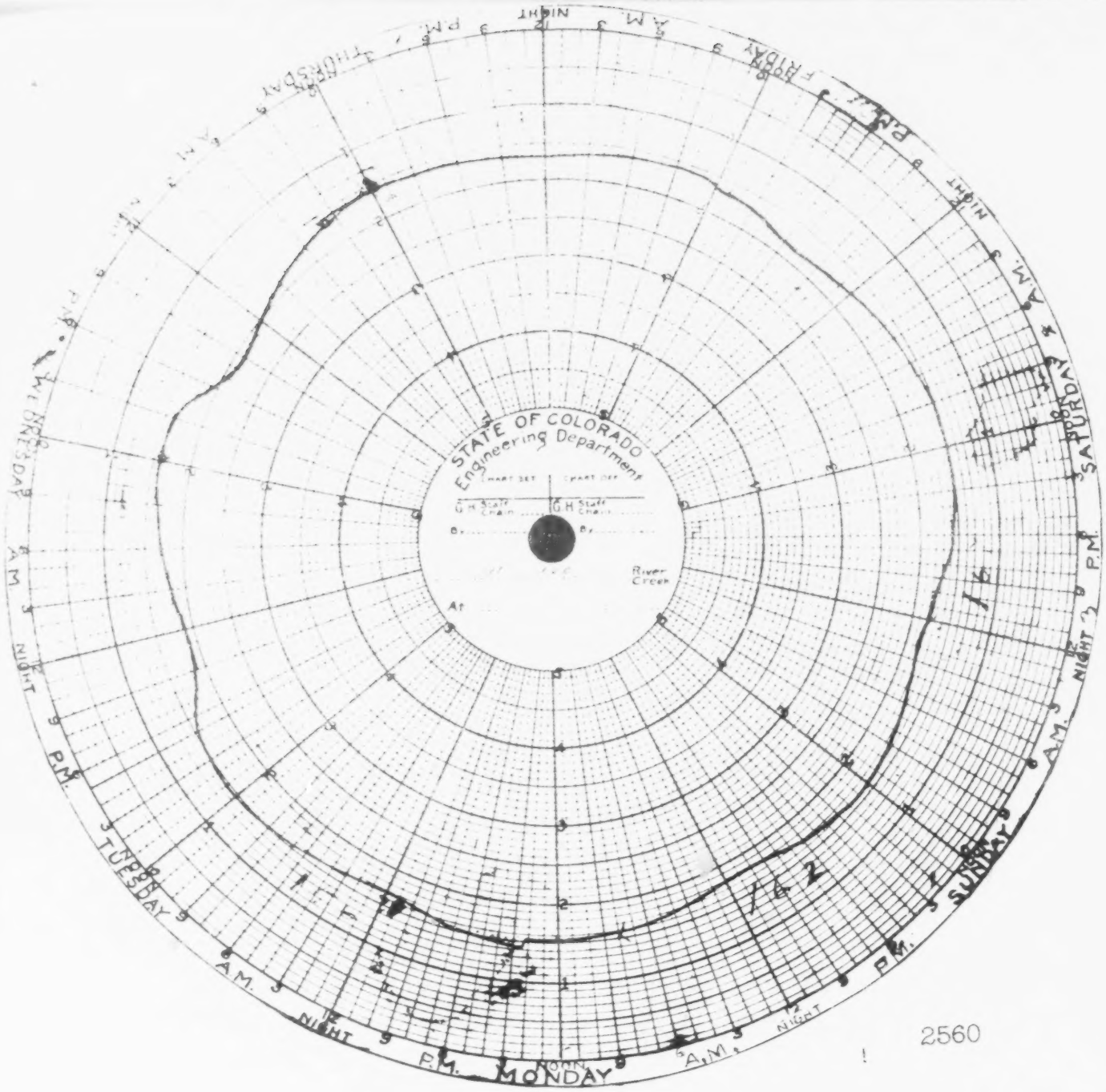
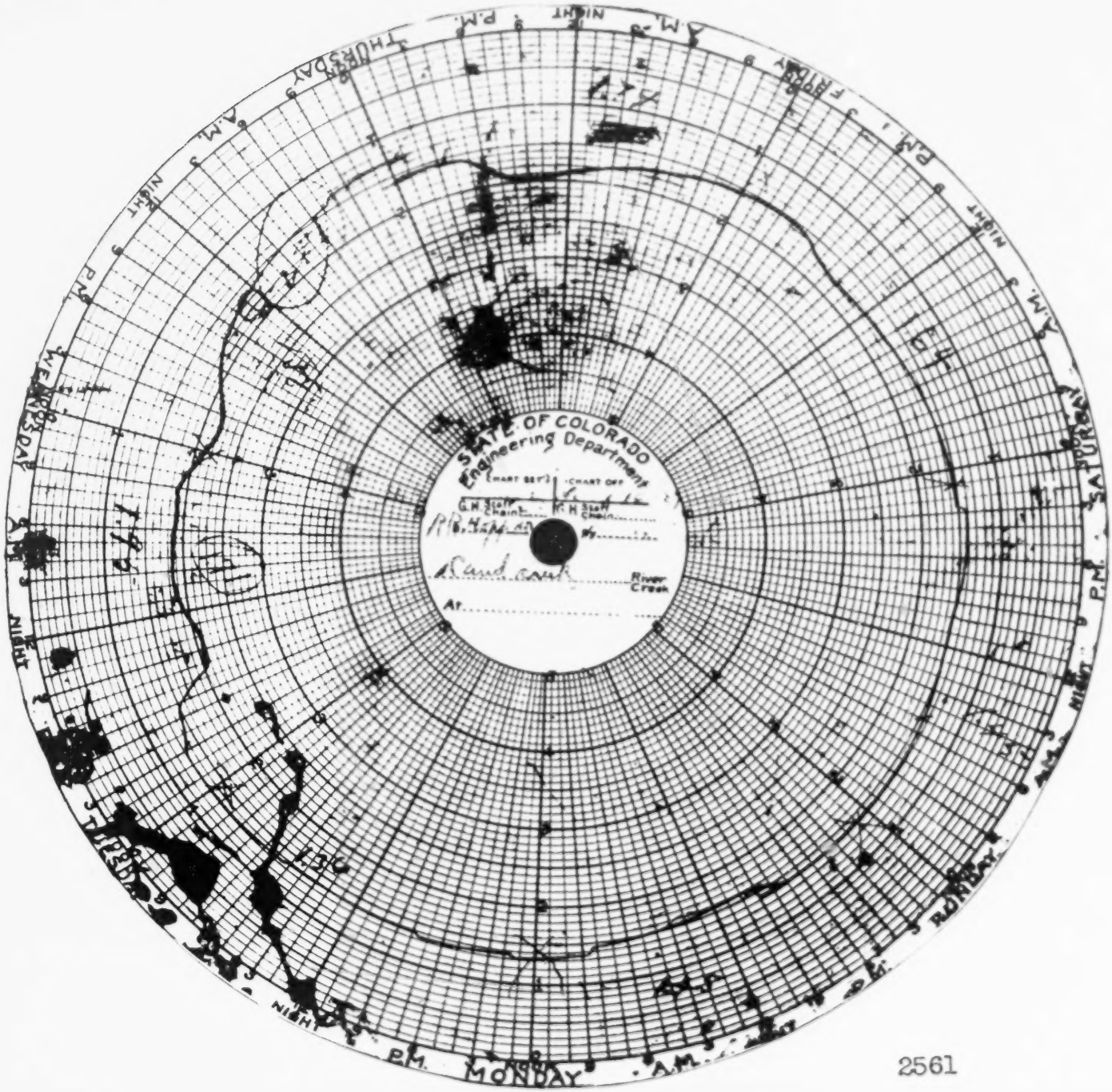

STATE OF COLORADO
Engineering Department
CHART SET
CHART OFF
G.H. Staff Chain
G.H. Staff Chain
By
By
River Creek
At
NIGHT
P.M.
A.M.
NOON
FRIDAY
SATURDAY
SUNDAY
MONDAY
TUESDAY
WEDNESDAY
THURSDAY
16
16.2

2560

COMPLAINANT'S EXHIBIT 70-3



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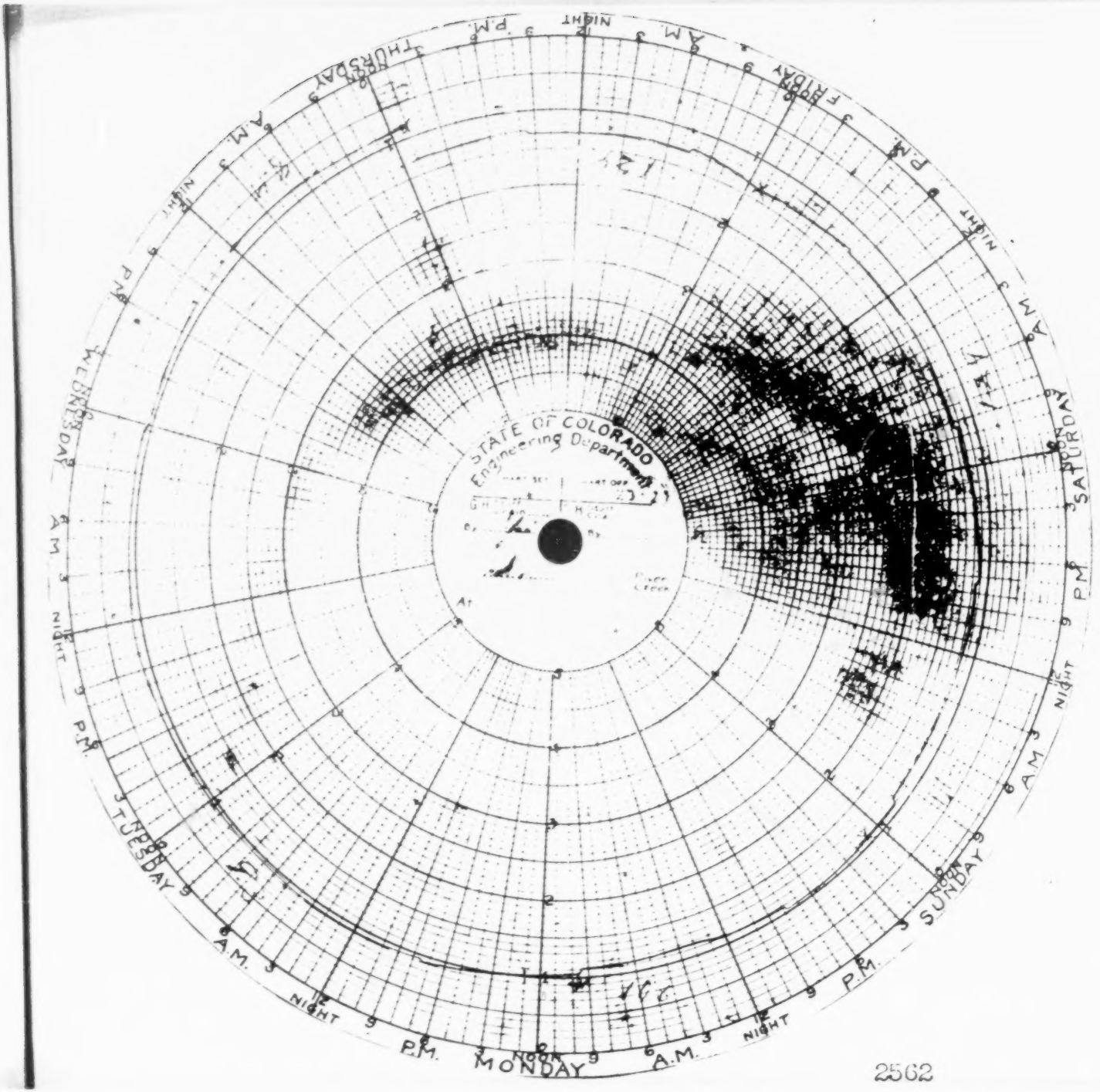
STATE OF COLORADO
Engineering Department
MONDAY
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THURSDAY
FRIDAY
SATURDAY
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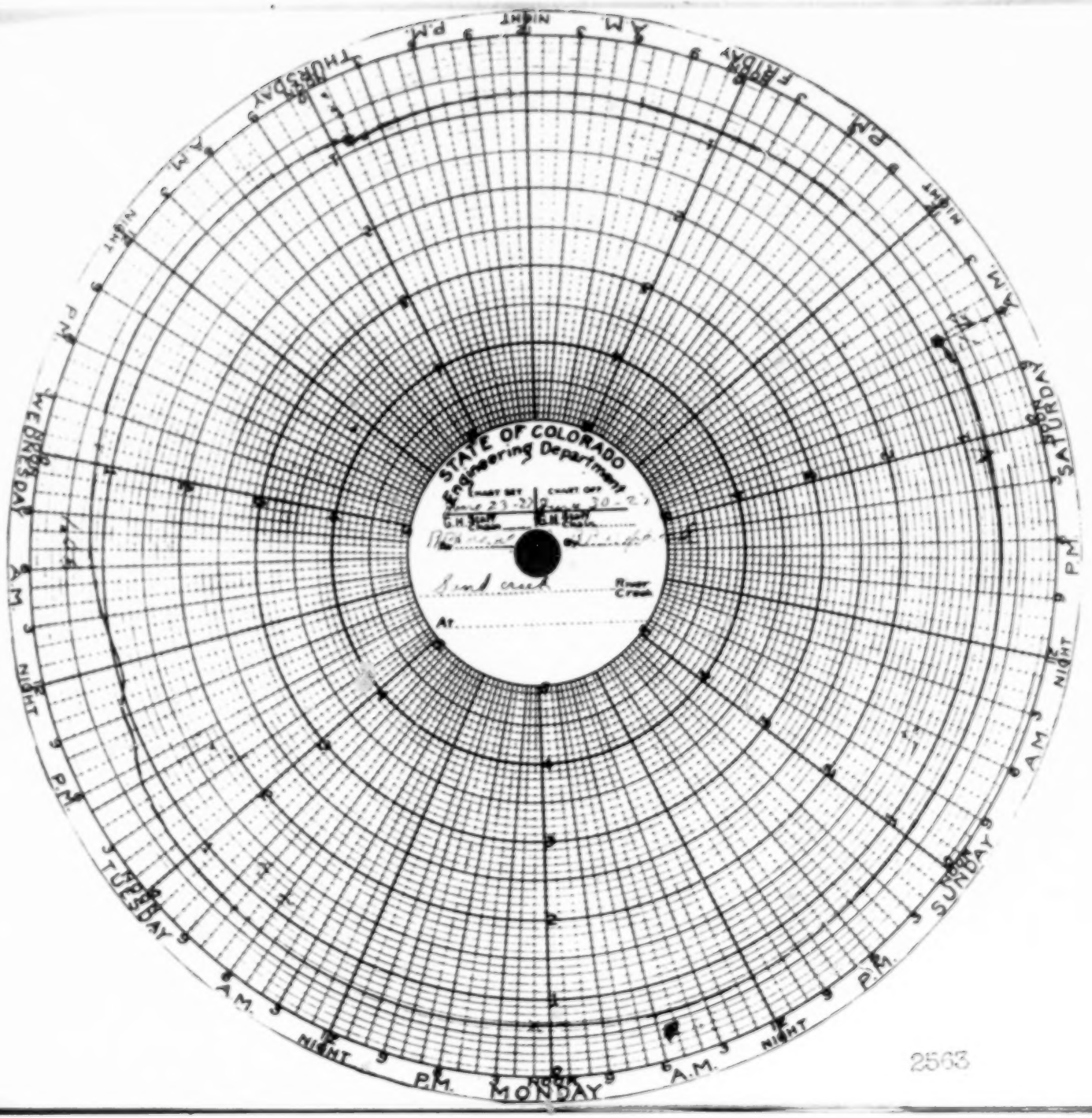
NIGHT
A.M.
P.M.
NOON

2562


STATE OF COLORADO
Engineering Department
MONDAY
TUESDAY
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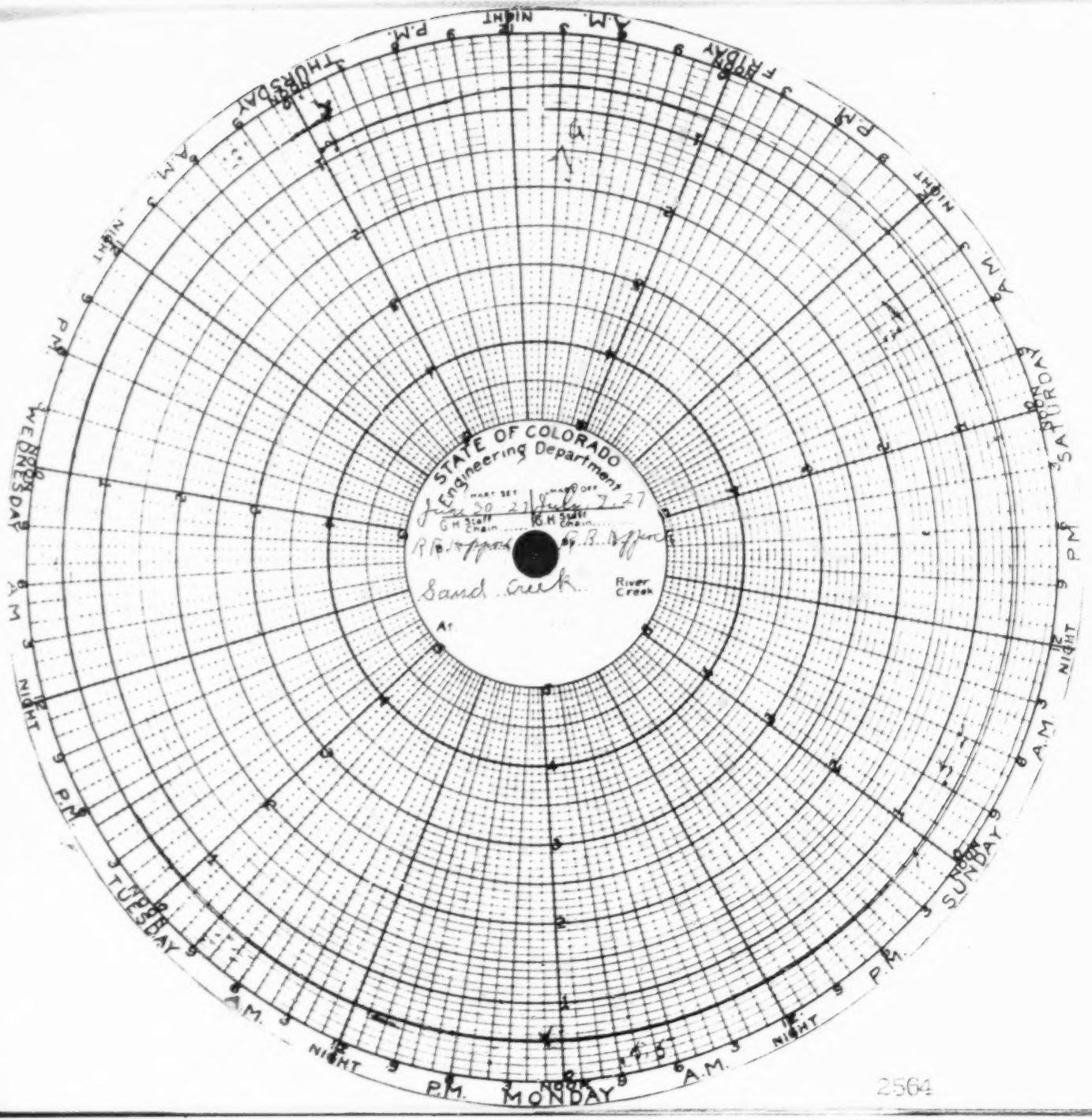
THURSDAY
FRIDAY
SATURDAY
SUNDAY
A.M.
P.M.
NIGHT
At

2563


STATE OF COLORADO
Engineering Department
Sand Creek
River
Creek
MONDAY
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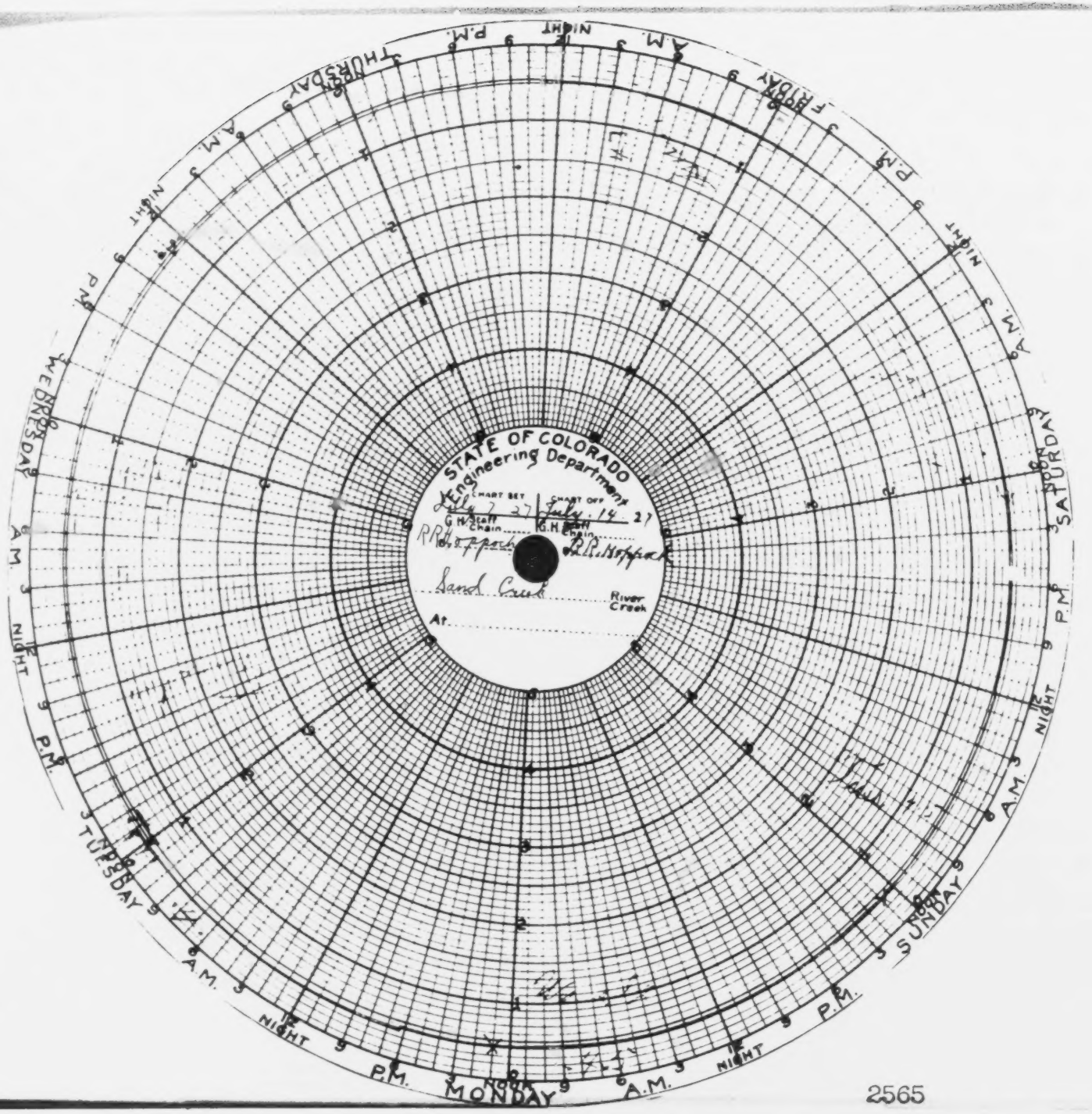
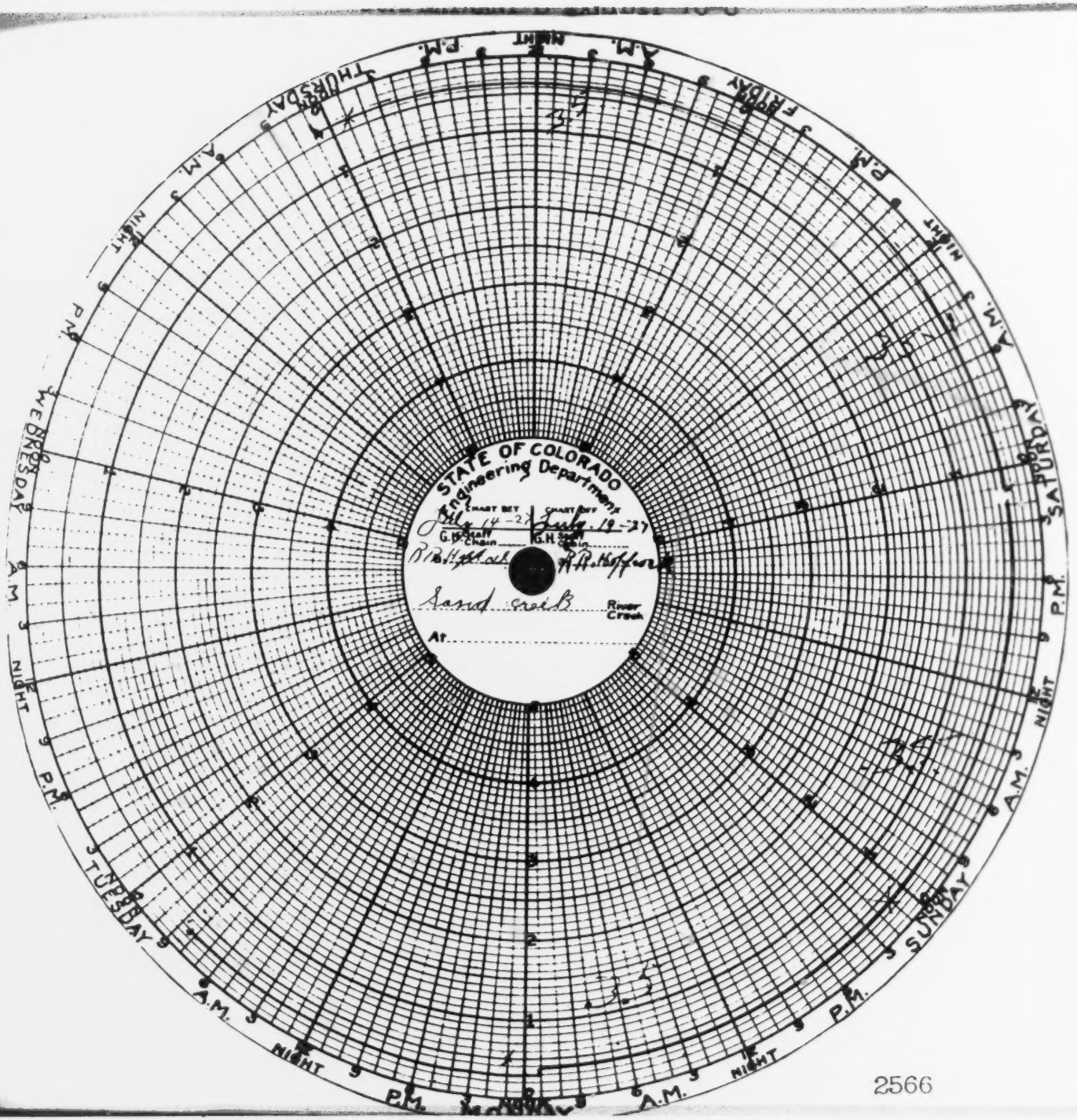
THURSDAY
FRIDAY
SATURDAY
SUNDAY
A.M.
P.M.
NIGHT

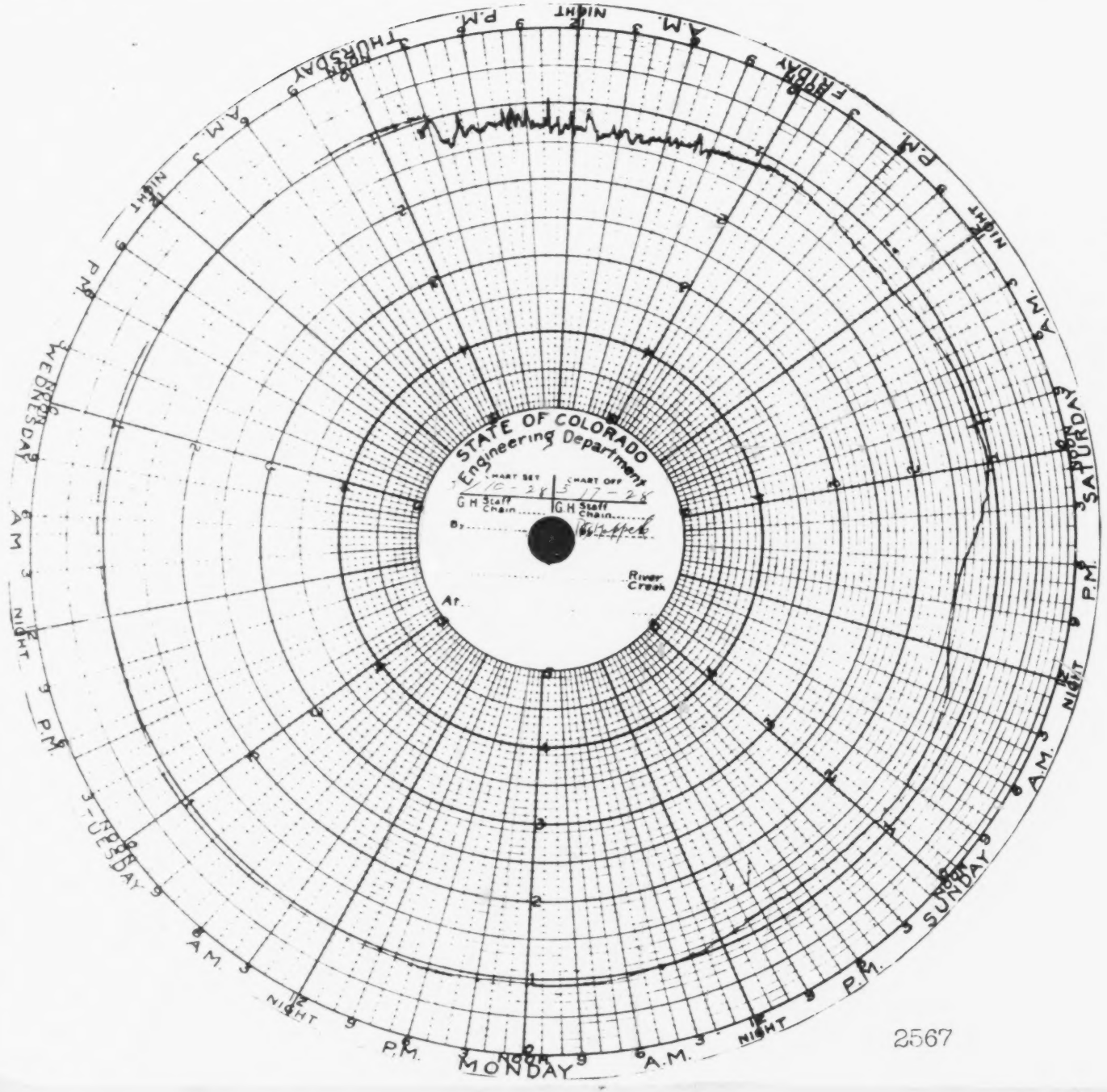

STATE OF COLORADO
Engineering Department
CHART SET
CHART OFF
July 7 27
July 14 27
G.H. Staff Chain
G.H. Staff Chain
RR Hoppock
R.R. Hoppock
Sand Creek
River Creek
At
THURSDAY
FRIDAY
SATURDAY
SUNDAY
MONDAY
TUESDAY
WEDNESDAY
NOON
NIGHT
A.M.
P.M.

2565


STATE OF COLORADO
Engineering Department
CHART SET
CHART SET
July 14-27
July 19-27
G.H. Staff Chain
G.H. Staff Chain
Sand creek
River Creek
At
THURSDAY
FRIDAY
SATURDAY
SUNDAY
MONDAY
TUESDAY
WEDNESDAY
NOON
NIGHT
A.M.
P.M.

2566

COMPLAINANT'S EXHIBIT 71



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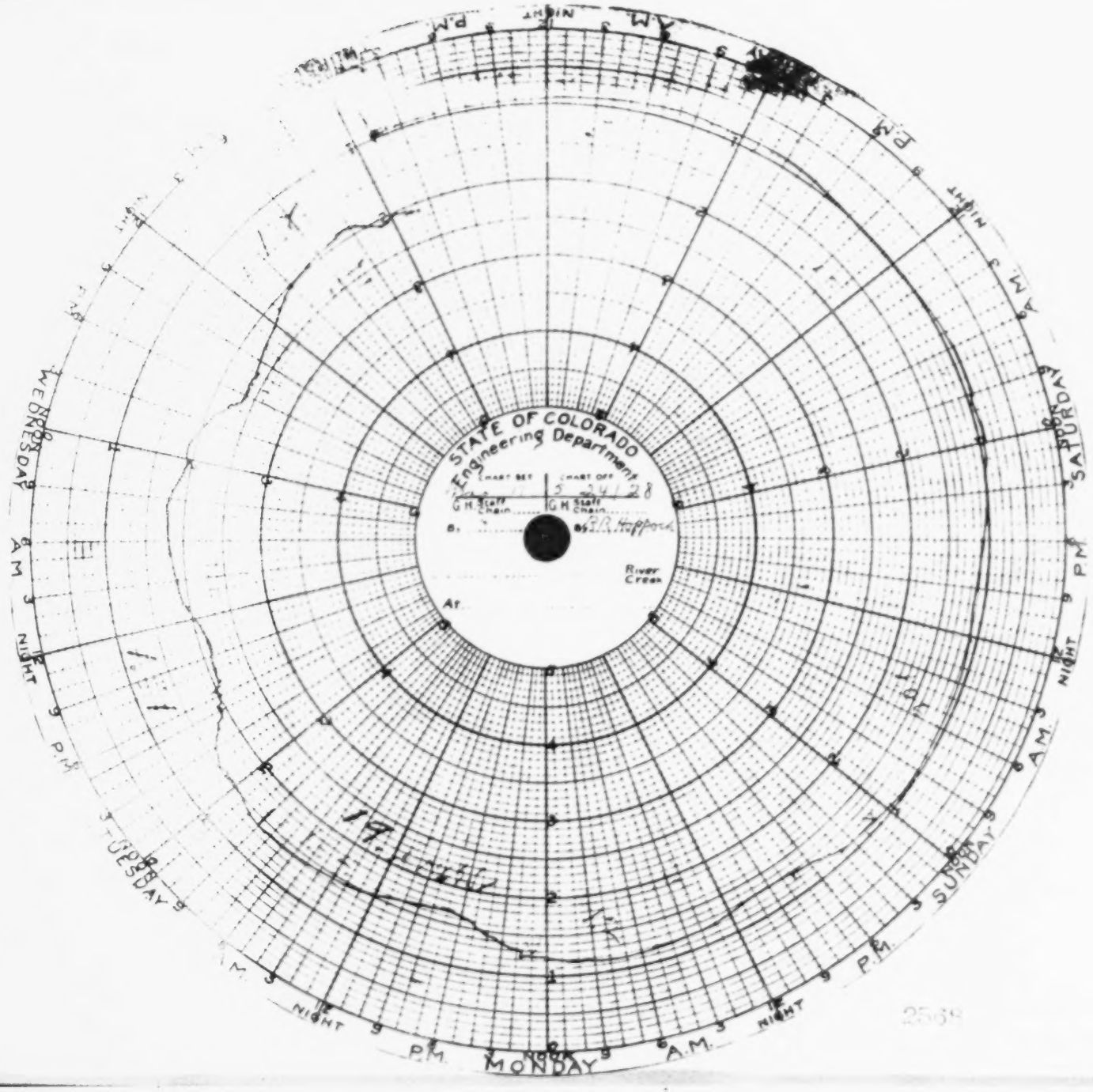
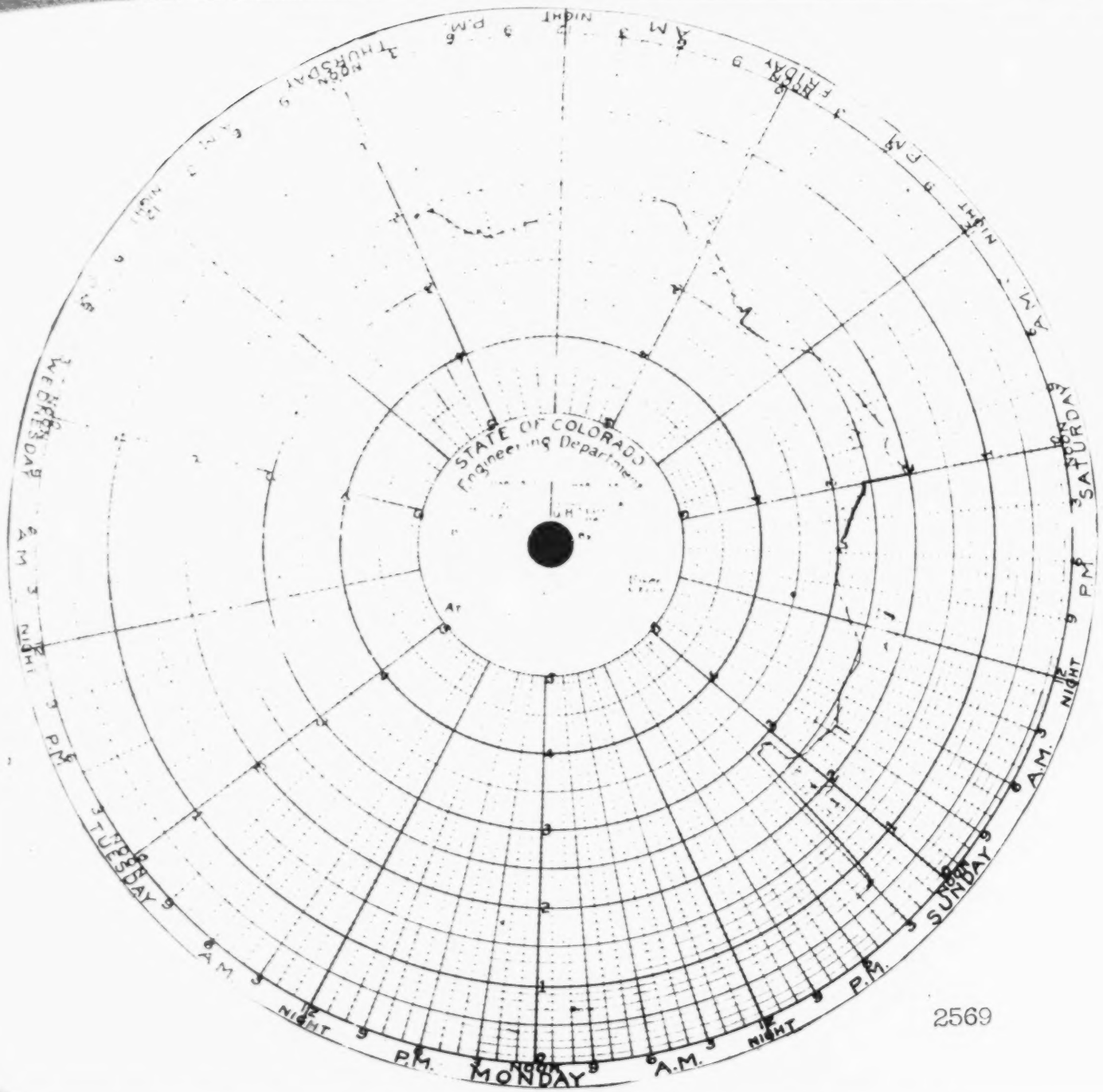
COMPLAINANT'S EXHIBIT 71-1




STATE OF COLORADO
Engineering Department
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THURSDAY
FRIDAY
SATURDAY
SUNDAY
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A.M.
P.M.
NOON
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2569

[fol. 2569-A] COMPLAINANT'S EXHIBIT No. 72

Conditions of Headgates and Rating Flumes

Meadow Ditches from Laramie River and Tributaries in Colorado, Water District #48

Field Trip of Sept. 16-19, 1932, by R. I. Meeker and Goyne Drummond, Engineers, Arranged from Head Down, both on Main Stream and Tributaries
Prepared by R. I. Meeker, Irrigation Engineer, September 20, 1932

Stream	Ditch	Headgate & Condition	Rating Flume & Condition
Laramie Main River	Link No. 1	No	No
	Parker	Yes, poor, from Slough	Yes, poor
	Timothy	No	No
	Wrights	Yes, fair	No
	Martin No. 1	Yes, good	No
	Martin No. 2	No, washed out	No
	Upper Hills	No	No Evidence of old R. F.
	Hills	No	No Evidence of old R. F.
	Unnamed	?	?
	Smith Brown	No	No Remains of old R. F.
	Yelton	No	No Remains of old R. F.
	Jimmy Cr. Ext.	No	No Remains of old R. F.
	Ferguson	No	No
	Detro No. 2	Yes, very poor condition	No
	Mansfield	Yes, old and poor condition	No
	Mansfield No. 2	Yes, very old, partly rotted out	No
	Bliler & Boswell	Yes, old and poor condition	No
	Warren	No evidence of old H. G.	No
Totals	18	7	1
Tributaries			
Link Cr.	Link No. 2	No	No
Deadman Cr.	Davy	Yes, fair	Yes, good tack gage on side
Nunn Cr.	Brown	Yes, 1st class	No
Stub Cr.	Cabin	Yes, good	No
	Stub	Yes, good	No
Brown Cr.	Forrester	No, empties into Brown D.	No
Petes Cr.	Unnamed	No	No
Lonetree Cr.	Unnamed	No	No
McIntyre	Talmage	Yes, good	No
	McIntyre	Yes, good concrete	No
	Comet	No	No
	Stuart #2	No, not used for long time, cannot divert present cond.	No
	Grants (Homestead)	Yes, fair	No
	Lamb	No	No

COMPLAINANT'S EXHIBIT No. 72—Continued

Stream	Ditch	Headgate & Condition	Rating Flume & Condition
Pine Cr.	Pine Cr.	No	No
Roaring Fk.	Comet	No	No
Brush	Unnamed	No	No
Unnamed	Homestead	No	No
Stuart	Stuart	No	No
Jimmy Cr.	Jim No. 1	No	No
	Jim No. 2	No	No
	Jim No. 3	Yes, fair	No
	Jim No. 4	No	No
	Ward #2	Yes, fair	Yes, of no value, old and out of repair
	Ward # 1	No	Yes, new, leakage underneath
	Unnamed Ditch	No	No
	Ollie	No	No
	Jimmy Cr.	No	No
Trollope Cr.	Trollope # 1	No	No
	Trollope #2	No, check gate in cr.	No
[fol. 2569-B]	Trollope #3	Yes, fair	No
LaGarde Cr.	LaGarde #1	Yes, fair	No
	LeGarde	Yes, good	No
McGuire Cr.	Nellie	No (Drummond) Diverts water into McIntyre Drainage	No (Drummond)
Brush Cr.	Schnitger	No, old, rotted H. G. of no value	No
	Pache	Yes, excellent condition	No
Little Jenkins	Homestead #2	No	No
	Unnamed	No	No
Big Jenkins	Homestead #1	No	No
	Unnamed	No	No
Forrester Cr.	Unnamed to Ballard R.	?	?
	Forrester	No	No
	Dietro #1	Yes, fair	No
Grace Cr.	Grace	Yes, fair Enlarging and cleaning 800 ft. of ditch near upper end.	No
	Hance	Yes, very good cond., displaced	No
Stuck Cr.	Stuck, left bank	Yes, new good cond.	No
	right bank	No	No
Totals	46	17	3

Summary:	Ditches	Headgates	Rating	Flumes
Laramie R.	18	7	39%	1
Tributaries	46	17	37%	3
Totals	64	24		4
%	100	37%		6%

[fol. 2570] COMP. EXHIBIT No. 73

STATE OF COLORADO,
City and County of Denver, ss:

I, M. C. Hinderlider, State Engineer of the State of Colorado, do hereby certify that the attached, consisting of two (2) sheets, is a true and correct copy of the Water Commissioner's Annual Ditch and Reservoir Report of Water District No. 48, Irrigation Division No. 1, for the year 1927, as the same appears in the official records on file in my office.

Given under my hand and official seal this 18th day of September, A. D. 1930.

M. C. Hinderlider, State Engineer, by C. C. Hezmalhalch, Deputy. (Seal State Engineer of Colorado.)

(Here follow photolithographs of side folios 2571 and 2572.)

OMMISSIONI
IE IRRIGATION

48

(13) Total No. of Acres that can be irr.	(29) REMARKS	
	(14) Alfalfa	(15) Natural Grasses
200		20
40		4
80		
100		
30		
60		
45		
125		12
60		

SOURCE OF INFORMATION, ETC.

was made from estimates per acre. given to me by

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2572

R H Moser

Water Commission C Dist No. 48.

[fol. 2573] COMPLAINANT'S EXHIBIT No. 74

STATE OF COLORADO,

City and County of Denver, ss:

I, M. C. Hinderlider, State Engineer of the State of Colorado, do hereby certify that the attached, consisting of two (2) sheets, is a true and correct photostat copy of the Water Commissioner's Annual Ditch and Reservoir Report of Water District No. 48, Irrigation Division No. 1, for the year 1928, as the same appears in the official records on file in my office.

Given under my hand and official seal this 18th day of September, A. D. 1930.

M. C. Hinderlider, State Engineer, by C. C. Hezmalhalch, Deputy. (Seal State Engineer of Colorado.)

(Here follow photolithographs of side folios 2574 and 257

1130A

MISSIONER

RRIGATION SE

(1)			(29)
	(14)	(15)	HARKS
that can be irrigated	Alfalfa	Natural Grasses	ICE OF TION, ETC.
00		200	
40		40	
90		35	
00		25	
30		30	
60		60	
70		50	
50		50	
5		125	
0			
0			
5			
0			
0			
0			
0			
0			
0			
0			

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Water Commissioner, District No. 48

[fol. 2576] COMPLAINANT'S EXHIBIT No. 75

STATE OF COLORADO,

City and County of Denver, ss:

I, M. C. Hinderlider, State Engineer of the State of Colorado, do hereby certify that the attached, consisting of two (2) sheets, is a true and correct photostat copy of the Water Commissioner's Annual Ditch and Reservoir Report of Water District No. 48, Irrigation Division No. 1, for the year 1929, as the same appears in the official records on file in my office.

Given under my hand and official seal this 18th day of September A. D. 1930.

M. C. Hinderlider, State Engineer, by C. C. Hezmalhalch, Deputy. (Seal State Engineer of Colorado.)

MMISS

E IRRIG/T

(13) Total No. of Acres that can be Irrigated	(29) MARKS (1) RCE OF ATION ETC
200	here in was obtained
40	ervation and by
35	various land owners
100	
30	
160	rs. first & last
70	
125	
60	
150	
175	
60	

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RKS

E OF
ION, ETC.

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R. A. Mosier
Water Commissioner, District No. 48

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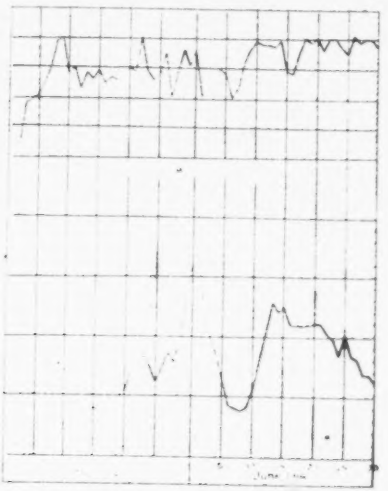
COMPLAINANT'S EXHIBIT 76

sequently the subsequent increase in temperature caused an immediate increase in discharge. Had the drop in temperature occurred after the snow had melted, there would have been no subsequent increase in discharge.

Relation between total snowfall and maximum run-off.—As the discharge of the mountain streams is mainly dependent upon the mountain snow, the water equivalent of the snow that accumulates [illegible] drainage basin determines the total run-off of the following [illegible] the snow falls early in the winter, it becomes compact and



[illegible] Gunnison River below Ohuray, Colo., showing relation [illegible] temperature and daily discharge.

melts slowly in the spring, causing the high-water period to be prolonged, but the water does not reach so high a maximum stage. On the other hand, if the snow falls late in the season it is loose and melts more readily, producing a short high-water period with a high maximum discharge. The maximum discharge depends not only upon the amount of mountain snow but also upon the rapidity with which the temperature rises in the spring. Figures 11 and 12 show the high-water hydrographs for two Colorado mountain streams for 1917 and 1918, together with the maximum daily temperatures for the

two years. In 1918 the temperature was high during the later part of May and increased rapidly during the first half of June. This caused the streams to rise rapidly to a high maximum and then recede rapidly, as the snow was soon melted. In contrast to this, in 1917 the temperature was low during the later part of May and increased but slowly during June; moreover, there were sudden drops in temperature during that period. As a result the discharge

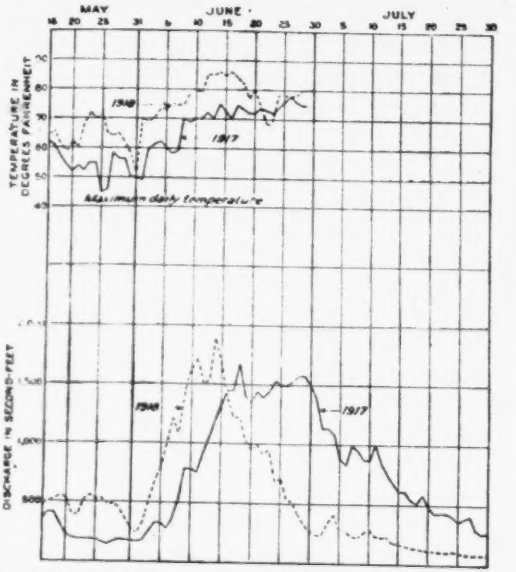


FIGURE 11.—High-water hydrographs for Uncompahgre River below Ohuray, Colo., showing relation between temperature and maximum discharge.

increased more slowly and receded more slowly, giving a longer high-water period but one that reached a lower maximum.

Diurnal fluctuations.—At the high altitudes of the Rocky Mountains, which range from 8,000 to 14,000 feet, the temperature during the 24-hour period fluctuates 20° to 30° or more, and during the spring this fluctuation causes the snow to melt during the warmer part of the day but to remain frozen the remainder of the time. This in turn causes a diurnal variation in the amount of water entering

2579-2581

the streams. Figures 13, 14, and 15 show the change in discharge during each 24-hour period for a week or more during high water for three typical streams. The discharge was determined from continuous gage-height graphs obtained by means of water-stage recorders. It will be seen that the hours of maximum and minimum discharge are not the same for each stream, as they depend upon the distance the melted snow has to travel before reaching the gage. For the Roaring Fork at Glenwood Springs fig. 13) the maximum and minimum daily temperatures are given.[2] It should be noted that the period covered by this graph includes the maximum discharge and

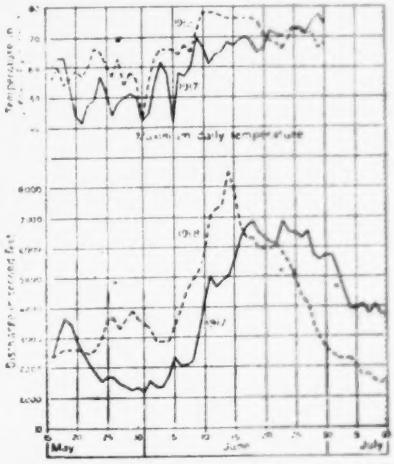


FIGURE 13.—Hydrographs for Colorado River at Hot Sulphur Springs, Colo., showing relation between temperature and maximum discharge.

that after June 14 the discharge decreased, although the temperatures continued high, a relation which shows that the snow had nearly disappeared.

The diurnal fluctuations are directly dependent upon the daily range of temperature up to the period of maximum discharge and also upon the increase in both maximum and minimum temperatures. Figure 16 shows the continuous discharge of Roaring Fork at Glenwood Springs from May 18 to June 10, 1919, together with the curve of maximum and minimum temperatures. From May 18 to 29 the extremes of temperature and their relation to each other remained

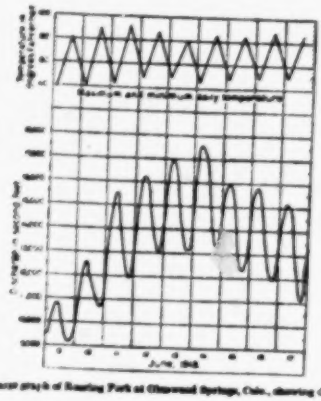


FIGURE 15.—Discharge graph of Roaring Fork at Glenwood Springs, Colo., showing diurnal fluctuations.

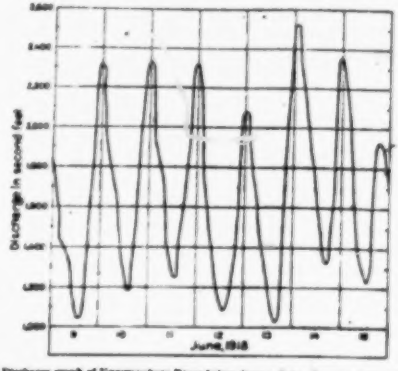


FIGURE 14.—Discharge graph of Uncompahgre River below Ouray, Colo., showing diurnal fluctuations.

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fairly constant, and as a result the diurnal fluctuations were somewhat uniform, although the mean discharge gradually increased. On May 30 the temperature suddenly dropped, and this resulted in an immediate decrease in the mean daily discharge and an almost complete elimination of diurnal fluctuations. Subsequently an increase in both mean and extreme temperatures caused a gradual increase in the mean daily discharge and a reappearance of the diurnal fluctuations, which increased in range as the temperature increased.

The range of fluctuation in percentage of mean discharge decreases as the distance of the point of measurement from the source increases,

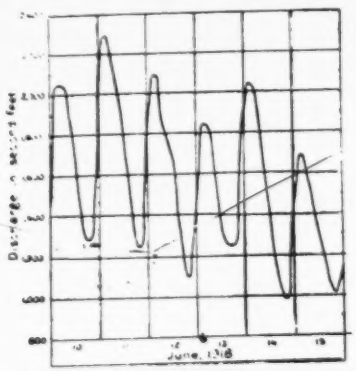

FIGURE 15.—Discharge graph of Tenmile Creek near Tenmile, Wash., showing diurnal fluctuations.

or, to express it in another way, as the drainage area above the point of measurement increases. This is due to the fact that water from melting snow in different portions of the drainage basin reaches the stream at different hours, thus tending to reduce the fluctuations. The larger the drainage basin the greater are the number of tributaries that bring their maximum discharges to the main streams at different hours and the greater the consequent equalizing effect. The accompanying table (p. 64) shows the percentage of variations in daily discharge of streams draining different-sized areas for simultaneous periods in 1918 and 1919.

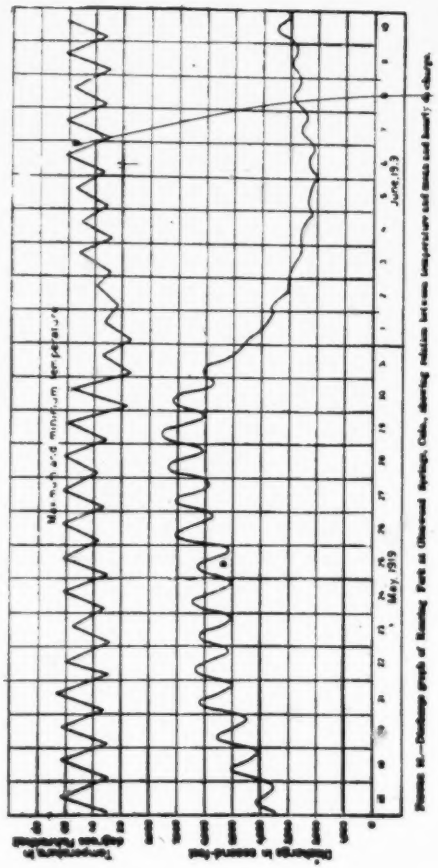

FIGURE 16.—Discharge graph of Roaring Fork at Glenwood Springs, Colo., showing relation between temperature and mean and hourly discharge.

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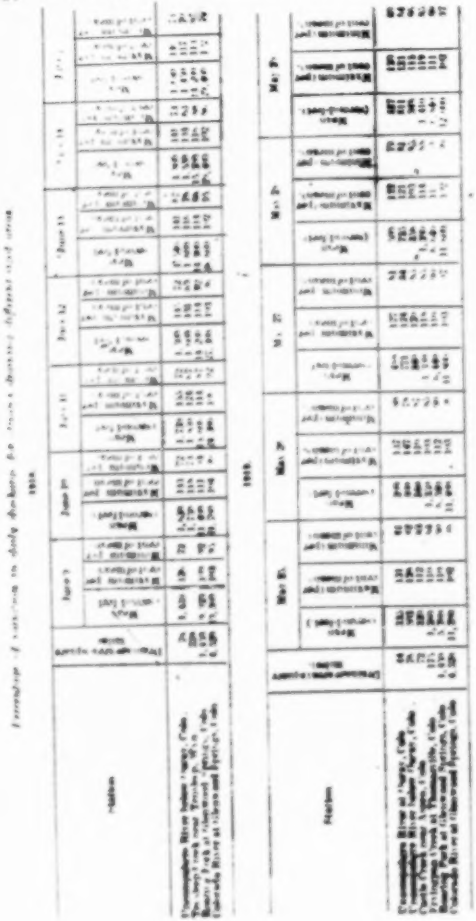


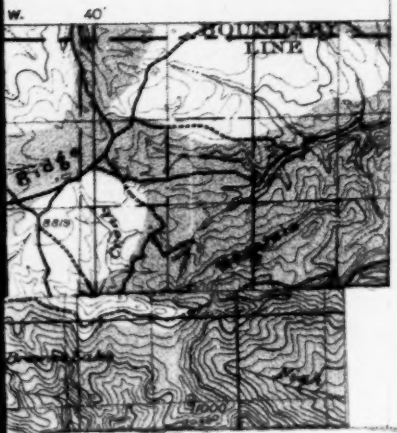
The drainage areas above the measuring points on the streams shown for the seven days in 1918 range from 76 to 1,530 square miles. The average maximum discharge ranged from 139 per cent of the mean for the smallest area to 103 per cent for the largest, and the average minimum discharge from 72 to 95 per cent. The drainage areas considered in the comparison for the five days in 1919 range from 44 to 4,720 square miles. The average maximum discharge ranged from 127 to 102 per cent of the mean for the smallest and largest areas, respectively, and the average minimum discharge ranged from 80 to 97 per cent. The range of percentages was smaller in 1919 on account of the smaller total discharge and the colder spring. The tabulation also shows the possible errors that may be made by basing computations of daily discharge upon one gage reading. The mean of two daily readings taken nearly 12 hours apart will be very much nearer the true mean for the day, as will be seen by inspecting figures 13 to 16.

UNIT RUN-OFF.

Stations in the same basin.—As snowfall, which is the chief source of run-off in the mountain streams, increases with altitude, it is evident that in general the upper portions of a drainage basin have a greater run-off per unit of area drained than the lower portions. It is not possible to show directly the varying run-off from different altitudes, but a comparison of the records for different stations on the same stream shows that the smallest unit run-off occurs at the lowest altitude. The table on page 66 shows three comparisons between stations in the same basin for practically the same years, together with an analysis of each drainage area, showing percentages above different altitudes. The figures represent the natural run-off, as allowances have been made for the few diversions that affect the run-off.

Laramie River at Glendevey, Colo., with 13 per cent of its drainage area above an altitude of 11,000 feet, has a mean annual run-off of 880 acre-feet to the square mile. At the station near Woods, Wyo., only 3 per cent of the drainage area is above 11,000 feet, and the remaining 97 per cent, of which 38 per cent is below 9,000 feet, contributes so small a run-off that the unit run-off for the entire drainage area is reduced to 474 acre-feet. Similarly Deep Creek, a tributary of Rock Creek, with its entire drainage area between 10,000 and 11,000 feet, has a run-off of 1,340 acre-feet to the square mile, but Rock Creek itself, which has only 43 per cent of its drainage area above 10,000 feet, has a run-off of only 804 acre-feet to the square mile. South Boulder Creek near Rollinsville, with 94 per cent of its drainage area above 9,000 feet and 13 per cent above 11,000 feet, has a mean annual run-off of 1,180 acre-feet to the square mile. At Eldo-

2584



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and forms an inclined table-land that is tra-
shallow gullies. On the map each of these
sented, directly beneath its position in the
ur lines.

interval, or the vertical distance in feet between
the next, is stated at the bottom of each map.
differs according to the topography of the area
flat country it may be as small as 1 foot; in a
gion it may be as great as 250 feet. Certain
every fourth or fifth one, are made heavier than
are accompanied by figures showing altitude.
many points—such as road corners, summits,
, and bench marks—are also given on the map
show altitudes to the nearest foot only. More
those of bench marks—as well as the geodetic
iangulation stations, are published in bulletins
ree by the Geological Survey.

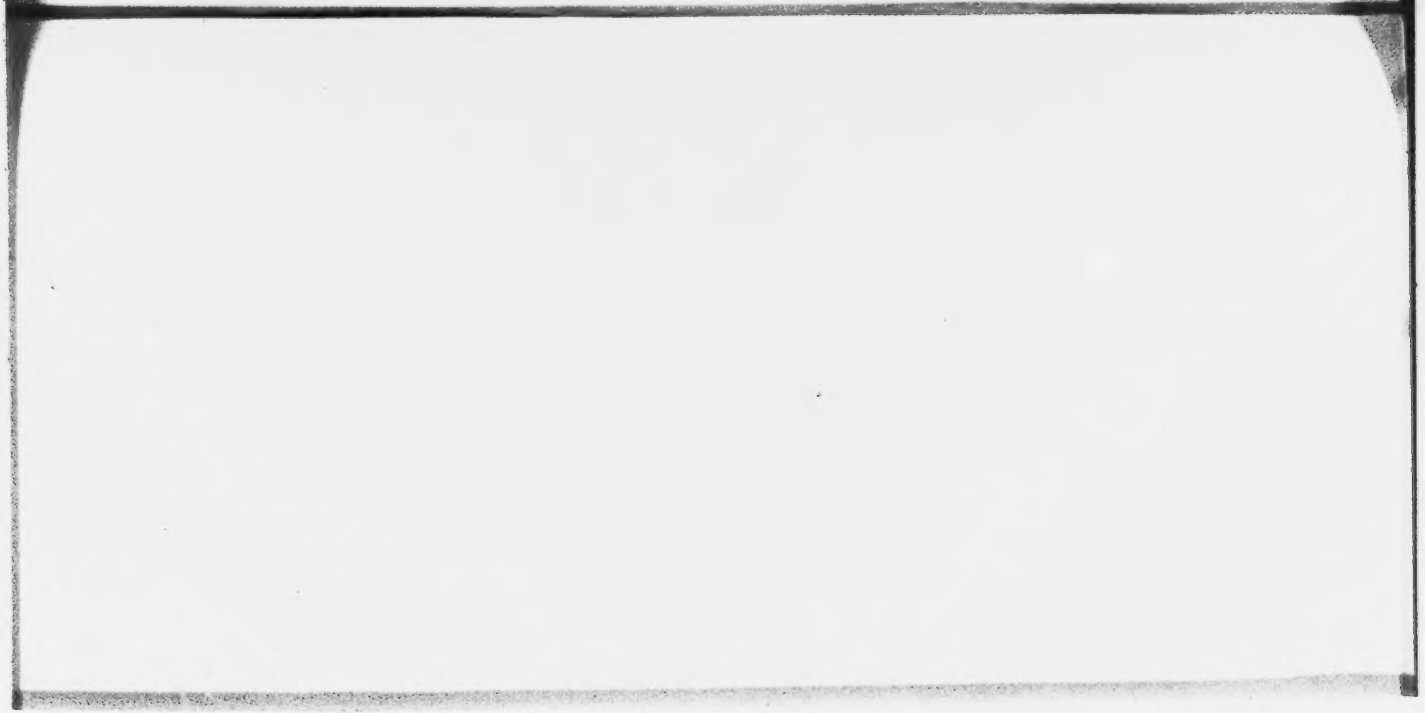
and works of man are shown in black. Boun-
s those of a State, county, city, land grant,
servation, are shown by continuous or broken
kinds and weights. Metaled roads are shown
one of which is accentuated. Other public
by fine double lines, private and poor roads-
le lines, trails by dashed single lines.

ngle is designated by the name of the principal
atural feature within it, and on the margins of
rinted the names of adjoining quadrangles of
ve been published. Over 2,800 quadrangles in
tes have been surveyed, and maps of them
ne on the other side of this sheet have been

hic map is the base on which the geology and

120710 17. West collecting canal of Laramie Poudre Tunnel, width on bottom 8 ft. in 4 ft. cut at outer bank. Tunnel No. 1. R.I.Meeker.

120710 16. West collecting canal of Laramie Poudre Tunnel, looking up canal from about Station 3.
R. I. Meeker



COMPLAINANT'S EXHIBIT 79

120710 9. West collecting canal of Laramie Poudre Tunnel showing sections in excavation and section where only right of way cleared.
R.I.Meeker.

120710 10. West collecting canal of Laramie Poudre Tunnel, looking down west side of Laramie River, excavation not continuous. R.I.Meeker.

COMPLAINANT'S EXHIBIT 80

120710 15. Laramie Poudre Dam on Laramie River near west portal of Laramie Poudre Tunnel, looking east, dam unfinished. R.I.Meeker.

120710 14. Concrete outlet conduit to unfinished dam of Laramie Poudre Tunnel. Water passing through conduit and through old creek bed. R.I.Meeker.

[fol. 2589] COMPLAINANT'S EXHIBIT No. 81

The Laramie River System of the Greeley-Poudre Irrigation District

The Greeley-Poudre Irrigation District, a quasi-public or municipal corporation, duly organized under the laws of the State of Colorado, is the owner and claimant herein of a general system of ditches, reservoirs and a tunnel now in process of construction in Water District No. 48, for the diversion, storage and conveyance of waters of the Laramie River and tributaries to the Cache la Poudre River, whence the same will be diverted into, and carried, stored, distributed and applied by means of a system of ditches and reservoirs in Larimer and Weld Counties, owned by the District, for the irrigation of 125,000 acres of land in Tps. 7 and 8 North, Range Sixty-seven West; Townships 7, 8 and 9 North, Range Sixty-six West; Townships 6, 7, 8 and 9 North, Range Sixty-four West; Townships 6, 7, 8 and 9 North, Range Sixty-three West, and Townships 7 and 9 North, Range Sixty-two West of the 6th P. M.; all in Weld County, Colorado, which lands go to make up and do constitute The Greeley-Poudre Irrigation District. The system of works, in Water District No. 48, shall be hereinafter designated in this and special findings as the "Laramie River System" of claimant and consists of the following several units, each of which is to a greater or less degree interdependent upon the other units operated therewith, all of which, working either alone or in conjunction one with another, constitute a complete system of works, the operation of each and all of the several units being necessary for the diversion and storage of water by the entire system:

[fol. 2590] The Rawah Ditch; The Rawah and Lower Supply Ditch; The McIntyre Ditch; The Deadman and Nunn Creek Ditch; The Laramie River Tunnel; The Link Lake Reservoirs, Nos. 1 to 14 inclusive; and The Tunnel Reservoir.

The system consists throughout of works requiring great financial outlay. It is located at elevations of from 8,500 feet to 11,500 feet above sea level, a portion thereof being at timber line and in the region of perpetual snows. All of the construction involves tunneling and excavation through

mountains and along the steep mountain sides on either side of the Laramie Valley, requiring a greater period of time in the completion thereof than would be required to complete an enterprise of like proportions situate under and surrounded by ordinary conditions. All supplies, machinery and labor must be transported by teams for a distance of from seventy to one hundred miles, in large part over mountain roads, from either Laramie, Wyoming, or Fort Collins, Colorado, under conditions least favorable to economical transportation.

Owing to the altitude, climatic conditions and geographical location of the system, the working season, during which men may be engaged in other than tunnel construction, and the season of transportation of freight, are limited to a short period of from three to four months out of each year. The remoteness of the works from railroads, towns, cities, and labor centers, makes the obtaining of laborers difficult, and requires payment of high wages and maintenance of expensive accommodations. The construction throughout is of hazardous character, requiring the use of dynamite, powder and other explosives and the services of a class of laborers hard to obtain and easily dissatisfied. The shortness of the working season requires a total disorganization of the entire laboring force at the close of each year's work and complete reorganization the next succeeding year. The foregoing and many other obstacles unknown to construction of irrigation works in plains or [fol. 2591] prairie regions or in regions of better climatic conditions and geographical location, require longer periods of time than would otherwise be necessary, reasonable diligence being a question of years as compared with months under ordinary conditions.

The construction of the system of works of the claimant upon the Laramie River were commenced by the initiation of surveys on August 25th, 1902, and since said date the work of engineering and construction has continued with diligence, notwithstanding financial and other obstacles although since 1911 active work upon said system has been in large measure suspended owing to the effect of litigation pending in the United States Supreme Court between Wyoming and Colorado, and involving the right of claimant to divert the waters of the Laramie River by means of this system of works.

The tunnel and other portions of said system are substantially complete and ready for diversion of water, while other portions are only in part constructed, all as will appear from the specific findings herein relative to each of the units of the system.

Owing to the conditions under which the work upon said system was commenced and since prosecuted and the many obstacles to be overcome, as well as those unmentioned as those hereinbefore specified, it is found that more than ordinary diligence has been exercised by the claimant, and its several predecessors, in the prosecution of said system of works from August 25th, 1902, to the present time.

This general finding shall apply to the whole system and each unit thereof and is made to avoid repetition insofar as possible. It shall apply to the several units of the system hereinatfer enumerated, without special findings or reference hereto in the findings for each unit, and shall be taken as incorporated in and as a part of the findings for each unit.

Each of the several units, while interdependent in large [fol. 2592] measure upon the other units of the system, nevertheless involves diversions from different tributaries of the Laramie River and is segregated into specific names and findings for the purpose of this decree. Each unit is given the same date of priority, and although different priority numbers are given, nevertheless each unit of said system shall have equal priority with each of the other units thereof.

[fol. 2593] Ditch No. 76—The Laramie River Tunnel of the Laramie River System

That said tunnel, as set forth in the findings herein, is entitled to Ditch Priority No. 75. It is claimed by The Greeley-Poudre Irrigation District, a corporation. It derives its supply of water from the Laramie River and the West Fork of the Laramie River. Its intake or point of beginning is on the east bank of the Laramie River, near the mouth of West Fork, and in the Northeast Quarter (NE¼) Southwest Quarter (SW¼) of Section Seven (7), Township Eight (8) North, Range Seventy-five (75) West of the 6th P. M., from which point it passes through and under the Green Mountains to the Cache la Poudre River. It is intended to be used for the diversion and carriage of

water from said streams to the Cache la Poudre River for the irrigation of the lands of claimant, and, also, as the principal unit or portion of the entire Laramie River System of the claimant, in conjunction with all the remaining units thereof, for the conveyance of all waters collected, regulated, diverted, conveyed and discharged at its west portion and into its Tunnel Reservoir, which said reservoir will be used for the regulation of the flow of water through said tunnel. It is 9½ feet wide by 7½ feet high in the clear and has a grade of 1.7 feet per thousand feet. Said tunnel is practically complete and ready for the carriage of water but no diversion or application of water from any of said sources has been made thereby, largely owing to litigation now pending between Wyoming and Colorado and involving the right to make such diversion.

It is hereby adjudged and decreed that said tunnel be given Ditch Priority No. 75, of date August 25, 1902, provided it be shown in a proper proceeding that it has been [fol. 2594] completed and water has been diverted and applied to the irrigation of lands within a reasonable time, but in no event shall said tunnel be awarded the right to divert from said several sources of supply more water than will flow through said tunnel as of the dimensions, grade and capacity aforesaid, when not used with its regulating basin, and in addition thereto, it shall be given the right to maintain the flow of water to its capacity when said tunnel is used in conjunction with the remaining units of said system for the carriage of water discharged into its west portal.

[fol. 2595] IN THE DISTRICT COURT

STATE OF COLORADO,
County of Laramie, ss:

I, Ray Baxter, Clerk of the District Court of the Eighth Judicial District of the State of Colorado, in and for the County of Larimer, do hereby certify the foregoing to be a full, true and complete copy of that part of the Report of Referee relating to the Laramie River System of the Greeley-Poudre Irrigation District and Ditch No. 76. The Laramie River Tunnel of the Laramie River System filed on the 14th day of February 1914 in Case No. 2725 entitled in the Matter of the Adjudication of Priorities of Water Rights in Irrigation District No. 48, of the State of Colo-

rado, for Irrigation and Other Beneficial Uses, as the same appears of record and on file in this office.

In Witness Whereof I have hereunto set my hand and affixed the seal of this Court at my office in Fort Collins, Colorado, this 27th day of February, A. D. 1928.

Ray Baxter, Clerk, by Eph F. Resek, Deputy. (Seal District Court, Larimer County, Colorado.

[fol. 2596] COMP. EXHIBIT No. 82

(663) No. 2725

In the Matter of the Adjudication of Priorities of Water Rights in Irrigation District No. 48, of the State of Colorado, for Irrigation and Other Beneficial Uses.

In the Matter of the Claim of The Greeley-Poudre Irrigation District for the Link Lake Reservoir No. 1.

ABRAHAM I. AKIN, being produced and sworn, testifies as follows:

Q. What is your name?
A. Abraham I. Akin.
Q. What is your post office address?
A. Fort Collins, Colorado.
Q. You are the same Abraham I. Akin who has testified in general with relation to the Laramie river system of The Greeley-Poudre Irrigation District in this proceeding?
A. I am.
Q. I will ask you whether or not you are familiar with Link Lake Reservoir No. 1?
A. I am.
Q. State whether or not that lake and reservoir constitutes a part of the Laramie river system concerning which you have testified.
A. It does.
Q. When did you first become familiar with that lake?
A. In August, 1902.
Q. Is it a natural lake or artificial in its present state?
A. In its present state it is a natural reservoir.
Q. With whom were you at the time you first became familiar with this lake?

A. Wallace A. Link.

Q. Is the lake capable of use as a reservoir for the storage of water for irrigation or domestic purposes?

A. It is.

Q. In its natural state could it be used by the installation of (664) outlet works?

[fol. 2597] A. Yes, sir; it could.

Q. State whether or not it is capable of use in conjunction with any of the ditches of the Laramie river system of the claimant for the more economic diversion and regulation of the flow of water in such ditches.

A. It is.

Q. What ditches is it capable of use with?

A. The Upper Rawah ditch of the Laramie-Poudre system and the Lower Rawah ditch, emptying into the Tunnel Reservoir.

Q. I will ask you where this lake is located.

A. It is located in the south east quarter of section 7, township 8 north, range 78 west.

Q. How many acres does it cover?

A. Thirty acres.

Q. Is that its present area?

A. Yes, sir.

Q. Is it feasible to construct this lake either by the installation of outlet works or the construction of a dam, or both, so as to hold water for storage?

A. It is.

Q. What is its depth?

A. Thirty-five feet.

Q. And at that depth of water what would the storage capacity of the lake be?

A. 45,738,000 cubic feet.

Q. When was work commenced by survey on this reservoir or the system of which it constitutes an essential part?

A. August 25, 1902.

Q. Were you present at that time?

A. Yes, sir.

Q. Who did the surveying?

[fol. 2598] A. (665 & 666) Frank Beach and myself.

Q. Out of what stream do the waters flow that fill this lake?

A. One branch of the Rawah Creek.

Q. Is it situated above or below the line of the Rawah ditch?

A. Above.

Q. By what means are the waters which can be stored in this lake, conveyed to the Laramie river tunnel? Describe, starting at the lake.

A. They are drawn from the lake through an outlet and from there through Rawah Creek, through No. 2 Reservoir and No. 3 reservoir of the system and taken out in the Upper Rawah ditch or the Lower Rawah ditch as needed.

Q. Are those waters taken out either by the Upper or Lower Rawah ditch at the points of interseption of the ditches with Rawah Creek?

A. Yes, sir.

Q. And if they are conveyed by the Rawah ditches where are they discharged?

A. In the Tunnel Reservoir.

Q. And from the Tunnel Reservoir?

A. Through the tunnel to the Cache la Poudre river.

Abraham I. Akin.

Subscribed and sworn to before me this 22d day of March, A. D. 1912.

L. R. Temple, Referee.

[fol. 2599] No. 76—The Laramie River Tunnel of the Laramie River System

(1100) The claimant of this tunnel is The Greeley-Poudre Irrigation District, a quasi-public or municipal corporation, organized and doing business under the laws of the State of Colorado, whose postoffice address is Greeley, Weld County, Colorado.

The Laramie River Tunnel, when used in its capacity as a single diversion unit of the Laramie River System of the claimant and without regard to the use thereof for the carriage of water delivered to it by other units of the system, derives its supply of water from the Laramie River and the West Fork of the Laramie River and all tributaries of each of said streams entering the same above the mouth of said West Fork. Said waters are diverted and conveyed, by said tunnel, through the Green Mountains to the Cache la Poudre River for use by the claimant, its water users and consumers, by rediversion and carriage, storage and application through the remainder of its system of works in Larimer and Weld Counties.

This tunnel is sometimes known as "The Laramie-Poudre Tunnel," or "The Greeley-Poudre Tunnel," of the claimant. It not only diverts and carries waters from the aforesaid streams in the manner as above stated, but, in addition thereto, is used with each and every of the several other units of the Laramie River System of claimant for the carriage of waters diverted, stored, carried and discharged by each and all of said units into said tunnel or into its regulating basin, the Tunnel Reservoir, situate at the west portal of said tunnel.

The intake or point of beginning of the said tunnel is on the east bank of the Laramie River at the mouth of the West Fork and in the NE¼ SW¼ of Section Seven (7), Town- [fol. 2600] ship Eight (8) North, Range 75 West (1101) of the 6th P. M., in Larimer County, Colorado, in Water District No. 48. From thence water is conveyed through an open cut for about 1100 feet to and into the west portal of said tunnel, from which point said tunnel extends in a general easterly-southeasterly direction under and through a range of mountains known as the Green Mountains and constituting the water shed between the Laramie and Cache la Poudre Rivers, a distance of about 12400 feet (including the 1100 feet of open cut aforesaid) and through portions of Sections 7, 8, 9 and 16, Township 8 North, Range 75 West of the 6th P. M. The waters conveyed through said tunnel are discharged near a point in the NW¼ NE¼ of Section Sixteen (16), Township 8 North, Range 75 West of the 6th P. M., whence the northwest corner of said Section 16 bears South 81° 35′ West about 3280 feet distant, and flow thence to the Cache la Poudre River.

Said tunnel is 9½ feet wide by 7½ feet high in the clear. It has a grade of 1.7 feet per one hundred feet and an estimated carrying capacity, without pressure of water in the Tunnel Reservoir, of about 1,000 cubic feet of water per second of time.

Said tunnel has a two-fold purpose, to-wit:

1st. For the diversion of waters from the Laramie River and the West Fork thereof at its point of intake and the conveyance of said waters to and into the Cache la Poudre River for purposes of irrigation as aforesaid.

2nd. As an integral part, unit or portion of the entire Laramie River System of ditches, reservoirs and tunnel of claimant, including the McIntyre, Rawah, Rawah & Lower

Supply and Deadman and Nunn Creek Ditches, the Link Lakes Reservoirs and the Tunnel Reservoir, each in this proceeding by separate findings described, and to be used in conjunction with the said remaining units or portions of said system for the conveyance of the waters collected, regulated, carried and discharged at the west portal by said [fol. 2601] ditches and (1102) reservoirs, in such manner as to give the maximum diversion, collection, storage and carrying capacity to said system and its various units or parts for the irrigation of 125,000 acres of land.

The increased head or pressure at the west portal of said tunnel, occasioned by increased depth of water in the Tunnel Reservoir, will give said tunnel an additional estimated carrying capacity of about 235 cubic feet of water per second of time, when said reservoir is filled to its high water line, and a total estimated carrying capacity of 1235 cubic feet of water per second of time by the use of said reservoir as a regulating, accumulation or controlling basin.

Work was commenced on said tunnel, along with the several other units of said Laramie River System of claimant, on or about August 25, 1902, and has since hitherto been prosecuted with exceptional diligence by claimant and its predecessors in title and interest, having been constructed at a speed exceeding all records theretofore established in the history of tunnel construction in tunnels of like dimension. The rock work was completed July 25, 1911, since which date various improvements have been made upon the same by claimant. It has not been used for the diversion or carriage of water owing to conditions growing, in large measure, out of litigation between Wyoming and Colorado, pending in the United States Supreme Court and involving the right of claimant to use said tunnel for the diversion of waters of the Laramie River. Owing to the fact that no diversion or beneficial use of water has been made by means of said tunnel, no findings and decree in that behalf can be made, save as to the date and number of its priority, which is hereby fixed as of August 25, 1902, and its priority is numbered Ditch Priority No. 75. The amount of its appropriation when finally fixed and determined, shall be limited to its present dimensions, grade and capacity from all sources of supply and diverted by said tunnel and each of its said co-ordinate units, for the irrigation of not to exceed 125,000 acres of land.

[fol. 2602] Reservoir No. 5—Link Lake Reservoir No. 1 of the Laramie River System

(1215) That said reservoir, as set forth in the findings herein, is entitled to Reservoir Priority No. 4. It is claimed by the Greeley-Poudre Irrigation District, a corporation. It is located in Larimer County, Colorado, upon the SE¼ of Section Seven (7), Township Eight (8) North, Range 76 West of the 6th P. M. It will be constructed across a branch of Rawah Creek and has no inlet ditch, said creek serving to convey water to said reservoir. Rawah Creek is used to convey waters from its outlet to the Laramie River Tunnel, by way of The Rawah Ditch or The Rawah & Lower Supply Ditch of claimant. It derives its supply of water from said branch of Rawah Creek, being that portion of said stream lying between the crest of the Medicine Bow range of mountains and said reservoir. This reservoir is intended to be used for the storage of water for irrigation, and, also, as an essential part of the Laramie River System of the claimant for regulating the flow of water through said system and to the Cache la Poudre River. The said reservoir is not as yet constructed, but it is intended to be constructed as follows: Area at high water line 30 acres, depth of water to be stored 35 feet and estimated storage and regulating capacity 45,738,000 cubic feet.

It is hereby adjudged and decreed that said reservoir be given Reservoir Priority No. 4, of date August 25 1902, provided it be shown in a proper proceeding that said reservoir has been completed and water has been diverted and applied thereby to the irrigation of lands within a reasonable time, but in no case shall the amount decreed said reservoir excel a storage depth of 35 feet above the bottom of the outlet tube and a capacity of 45,738,000 cubic feet.

[fol. 2603] In the District Court

State of Colorado,
County of Larimer, ss:

I, Ray Baxter, Clerk of the District Court of the Eighth Judicial District of the State of Colorado, in and for the County of Larimer, do hereby certify the foregoing to be a full and true copy of testimony of Abraham I. Akin in the Matter of the Claim of The Greeley-Poudre Irrigation District for the Link Lake Reservoir No. 1; and part of the

Decree relating to Reservoir No. 5, Link Lake Reservoir No. 1 of the Laramie River System and that part of the Decree relating to No. 76. The Laramie River Tunnel of the Laramie River System; said Decree having been signed on February 20, 1914 by Judge Neil F. Graham, and L. R. Temple being Referee all in Case No. 2725 entitled In the Matter of the Adjudication of Priorities of Water Rights in Irrigation District No. 48, of the State of Colorado, for Irrigation and Other Beneficial Uses, all of which appear of record and on file in this office.

In witness whereof I have hereunto set my hand and affixed the seal of this Court at my office in Fort Collins, Colorado, this 17th day of April, A. D. 1931.

Ray Baxter, Clerk, by Eph. F. Resek, Deputy. (Seal) District Court, Larimer County, Colorado.)

[fol. 2604] COMP. EXHIBIT No. 83

STATE OF COLORADO,
State Engineer's Office, ss:

I, M. C. Hinderlider, State Engineer of the State of Colorado, do hereby certify that the attached tabulations (consisting of three sheets) is a true and correct statement of the decrees awarded the ditches and reservoirs mentioned in said tabulation as evidenced by certified copies of decrees furnished this office by the District Courts in which said ditches and reservoirs are located.

Further, that portion of the tabulation headed "Discharge and Storage Records" is a true and correct statement of the maximum discharge of the ditches and storage in the reservoirs mentioned in said tabulations, as evidenced by the records of the Water Commissioners in the Water Districts in which said ditches and reservoirs are located.

Given under my hand and official seal this 13th day of October, A. D. 1926.

M. C. Hinderlider, State Engineer, by C. C. Hezmalhalch, Deputy. (Seal State Engineer of Colorado.)

[fol. 2605] Decrees

Ditch or Reservoir	District	Decree
Grand River Ditch	51	Sept. 1, 1890 for 524.6 c.f.s.
Cameron Pass Ditch	47	July 30, 1882 for 10.0 c.f.s. July 7, 1898 for 18.0 c.f.s.
Sky Line (Laramie River Ditch)	48	Aug. 7, 1891 for 18000 ac. ft. per yr.
Rawah Ditch	48	Aug. 25, 1902 for 225 c.f.s. conditional
Laramie River Tunnel	48	Aug. 25, 1902 for 15500 ac. ft. per yr. conditional.
Dead Man and Nun Cr. Ditches	48	Aug. 25, 1902 for 275 c.f.s. conditional.
Lower Supply Ditch (Decreed as Rawah & Lower Supply)	48	Aug. 25, 1902 for 275 c.f.s. conditional.
Laramie River Reservoir	48	April 6, 1908 for 1,940,000,000 cu. ft. conditional.
Link Lake No. 1	48	Aug. 25, 1902 for 45,738,000 cu. ft. conditional.
Link Lake No. 2	48	Aug. 25, 1902 for 60,984,000 cu. ft. conditional.
Link Lake No. 3	48	Aug. 25, 1902 for 22,869,000 cu. ft. conditional.
Link Lake No. 4	48	Aug. 25, 1902 for 25,780,000 cu. ft. conditional.
Link Lake No. 5	48	Aug. 25, 1902 for 30,492,000 cu. ft. conditional.
[fol. 2606]		
Link Lake No. 6	48	Aug. 25, 1902 for 13,068,000 cu. ft. conditional.
Link Lake No. 7	48	Aug. 25, 1902 for 19,166,000 cu. ft. conditional.
Link Lake No. 8	48	Aug. 25, 1902 for 87,120,000 cu. ft. conditional.
Link Lake No. 9	48	Aug. 25, 1902 for 25,000,000 cu. ft. conditional.
Link Lake No. 10	48	Aug. 25, 1902 for 18,500,000 cu. ft. conditional.
Link Laek No. 11	48	Aug. 25, 1902 for 50,000,000 cu. ft. conditional.
Link Lake No. 12	48	Aug. 25, 1902 for 6,000,000 cu. ft. conditional.
Link Lake No. 13	48	Aug. 25, 1902 for 26,000,000 cu. ft. conditional.
Link Lake No. 14	48	Aug. 25, 1902 for 26,000,000 cu. ft. conditional.

[fol. 2607] Comp. Exh. No. 83

Discharge and Storage Records

Ditch or reservoir	Maximum discharge	Storage
Skyline (Laramie River Ditch)	1915—122 c. f. s. 1916—138 c. f. s.	
Laramie River Tunnel	1922—320,804,064 cu. ft. 1923—468,930,400 cu. ft. 1924—323,338,300 cu. ft.	
Laramie Lake	.....	1914— 5,000,000 cu. ft.
Lost Lake	.....	1914—10,000,000 cu. ft. 1922— 9,000,000 cu. ft.

[fol. 2608] Comp. Exhibit No. 84

No. 73—The Rawah & Lower Supply Ditch of the Laramie River System

The claimant of this ditch is The Greeley-Poudre Irrigation District, a quasi-public or municipal corporation, organized and doing business under the laws of the State of Colorado, whose postoffice address is Greeley, Weld County, Colorado.

Said ditch takes its supply of water from Rawah, West Springer, Rapid, Fall, Winifred, Mill and divers other creeks situate between the Rawah Creek and the Laramie River Tunnel, each of which said creeks is a tributary of the Laramie River, entering said stream on the west side thereof and is intersected by the said canal and the waters of each thereof are diverted and conveyed by means of said ditch to the Tunnel Reservoir of the claimant, and thence through the Laramie River Tunnel to the Cache la Poudre River.

This ditch is sometimes known as "The Lower Supply Ditch," "The Lower Rawah Ditch," "The West Side Collection Ditch," "The West Side Ditch" or "The West Feeder Ditch," and includes under one name separate units of said ditch line heretofore known as "The Rawah Pipe Ditch," "The Rawah Pipe Line," "The Fall Creek Ditch," and "The Fall Creek Pipe Line," (said pipe lines being now substituted by tunnels along the line of this ditch) of the Laramie River System of claimant. The said ditch not only diverts and carries water from the several streams and tributaries of the Laramie River aforesaid, but also, and in conjunction with the Rawah Ditch, McIntyre Ditch, Link Lakes Reservoirs and Tunnel Reservoir, will be used for the carriage of waters stored in Link Lakes Reservoirs or diverted from McIntyre Creek by means of the McIntyre Ditch, in manner more specifically set forth in the findings and decree pertinent to said reservoirs and McIntyre Ditch.

[fol. 2609] The headgate or place of beginning of said ditch is in the east or south bank of Rawah Creek in Larimer County, Colorado, near a point in the Southwest Quarter (SW¼) Southeast Quarter (SE¼) of Section Fourteen (14), Township Nine (9) North, Range Seventy-six (76) West of the 6th P. M., whence the southeast corner of said section bears South 71 degrees 0′ West about 2540 feet distant. Said ditch extends thence in a general southeasterly direction a distance of about 4.7 miles and traverses portions of Sections 14, 23, 25, 26 and 36 in Township Nine (9) North, Range 76 West; Sections 1 and 12, Township Eight (8) North, Range 76 West, and Section 7, Township Eight (8) North, Range 75 West of the 6th P. M., to the east terminus thereof, being the point where the said ditch discharges its waters into the bed and channel of the Lara-

mie River, at or near the west portal of the Laramie River Tunnel and into the accumulation basin of the Tunnel Reservoir. The said ditch intersects the several streams aforesaid along its course, and has at each of said points of intersection appliances for diversion, thereby constituting, as to each of such, a point of diversion at the said point of intersection of the line of said ditch with the thread of each of such streams.

The said ditch is divided into four divisions, for purpose of description, each of which are, or will be when complete, of the following dimensions, length and capacities:

Division	Material	Bottom width	Side slopes of banks	Depth water	Grade, per 1000 ft.
Rawah Creek	loose	9 ft.	1 to 1	4 ft.	2 ft.
	solid	8 ft.	1-2-to 1	4 ft.	3 ft.
Rapid Creek	loose	10 ft.	1 to 1	4.5 ft.	1.5 ft.
	solid	9 ft.	1-2 to 1	4.5 ft.	3 ft.
Fall Creek	loose	11 ft.	1 to 1	4.5 ft.	1.5 ft.
	solid	10 ft.	1-2 to 1	4.5 ft.	2.7 ft.
Mill Creek	loose	11 ft.	1 to 1	4.6 ft.	1.5 ft.
	solid	10 ft.	1-2 to 1	4.6 ft.	2.7 ft.

Length: feet	Cap. cu. ft.	3100	275
16000	200		
2400	250		
3300	270		

[fol. 2610] The Link Lakes Reservoirs Nos. 1 to 14, inclusive, as well as the Tunnel Reservoir, are claimed as regulating or expansion basins and works for this ditch, and the Rawah Ditch, hereinafter mentioned, as will appear in the specific findings and decree for each of said reservoirs, and the waters diverted and carried by this ditch are for final discharge into the Cache la Poudre River through the Laramie River Tunnel of claimant.

The said ditch constitutes an essential unit or portion of the diversion and storage system of the claimant in Water District No. 48, and is to be so used in conjunction with the remaining units of said system as to give to the claimant the maximum diversion, storage and carrying capacity of said system and its several units, including this unit, when used singly or in conjunction with one another for the irrigation of not to exceed 125,000 acres of land.

Work was commenced upon this ditch, along with the several other ditches and reservoirs and the tunnel going to make up the several units of the Laramie River diversion and storage system of claimant, on or about August 25,

1902, and has since hitherto been prosecuted with due diligence by the claimant and its predecessors in title and interest, but owing to the fact that said ditch is not wholly completed and no diversion of water has been made thereby no findings in behalf of said ditch can be made, save as to the date and number of its priority, which are hereby fixed as August 25, 1902, and its priority is numbered Ditch Priority No. 72. The amount of its appropriation, when finally fixed and determined, insofar as its diversion along its line from aforesaid creeks is concerned, shall be limited to 275 cubic feet of water per second of time from all of said streams, with privilege of maintaining the flow in said ditch constant at said capacity by use of the Link Lakes Reservoirs and the Rawah and McIntyre Ditches and other works of the district as expansion, regulating and co-ordinate works, and sufficient by diversions of this and all the other units of said system for the irrigation of not to exceed 125,000 acres of land.

[fol. 2611] Ditch No. 73—The Rawah & Lower Supply Ditch of the Laramie River System

That said ditch, as set forth in the findings herein, is entitled to Ditch Priority No. 72. It is claimed by The Greeley-Poudre Irrigation District, a corporation. It derives its supply of water from Rawah, West Springer, Rapid, Fall, Winifred, Mill and divers other streams, tributary to the Laramie River, entering said stream on the west side thereof between Rawah Creek and the West Fork of the Laramie River. This ditch has its first or principal headgate on the east or south bank of Rawah Creek in Larimer County, Colorado, near a point in the Southwest Quarter (SW¼) Southeast Quarter (SE¼) of Section Fourteen (14), Township Nine (9) North, Range Seventy-six (76) West of the 6th P. M., whence the southeast corner of said section bears South 71 degrees 0′ West about 2540 feet distant, from which point it runs in a general southeasterly direction to the bed and channel of the Laramie River at a point near the west portal of the Laramie River Tunnel and in the Tunnel Reservoir, and from which said point of delivery said waters are conveyed through the Laramie River Tunnel to the Cache la Poudre River. It intersects the lines of said streams situate between Rawah

Creek and the West Fork of the Laramie River and has points of diversion as to each thereof, said points being in each instance identical with the point of intersection of said ditch with the south or east banks of said streams. It is intended to be used for the diversion and carriage of waters from the several streams above mentioned to the Laramie River Tunnel and its Tunnel Reservoir and thence to the Cache la Poudre River for the irrigation of the lands of claimant, and, also, as an essential part of the Laramie River System of the claimant for the carriage of waters stored and regulated in the Link Lakes Reservoirs, or waters conveyed by the McIntyre Ditch and delivered at the headgate of this ditch by use of Rawah Creek.

[fol. 2612] It is not fully completed and no water has been by it diverted or applied to a beneficial use. The dimensions, grade, size and carrying capacity of said ditch vary from the point of beginning to the point of discharge and are divided into four divisions, as follows:

Division	Material	Bottom width	Side slopes of banks	Depth water	Grade per 1000 ft.	Length feet	Cap. cu. ft.
awah Creek	Loose	9 ft.	1 to 1	4 ft.	2 ft.	16000	200
	Solid	8 ft.	1–2 to 1	4 ft.	3 ft.		
apid Creek	Loose	10 ft.	1 to 1	4.5 ft.	1.5 ft.	2400	250
	Solid	9 ft.	1–2 to 1	4.5 ft.	3 ft.		
all Creek	Loose	11 ft.	1 to 1	4.5 ft.	1.5 ft.	3300	270
	Solid	10 ft.	1–2 to 1	4.5 ft.	2.7 ft.		
ill Creek	Loose	11 ft.	1 to 1	4.6 ft.	1.5 ft.	3100	275
	Solid	10 ft.	1–2 to 1	4.6 ft.	2.7 ft.		

It is hereby adjudged and decreed that said ditch be given Ditch Priority No. 72, of date August 25, 1902, provided it be shown in a proper proceeding that it has been completed and water has been diverted and applied to the irrigation of lands within a reasonable time, but in no event shall said ditch be awarded the right to divert from said several sources of supply more than 275 cubic feet of water per second of time, with the right to maintain the flow in said ditch to said capacity by the conjunctive use of said ditch with the Link Lakes Reservoirs and the McIntyre Ditch.

[fol. 2613] IN THE DISTRICT COURT

STATE OF COLORADO,
County of Larimer, ss:

I, W. P. Hurley, Clerk of the District Court of the Eighth Judicial District of the State of Colorado, in and for the County of Larimer, do hereby certify the foregoing to be a full, true and complete copy of Findings and Decree entered in this Court in Case No. 2725 entitled: In the Matter of the Adjudication of Priorities of Water Rights in Irrigation District No. 48, of the State of Colorado, for Irrigation and Other Beneficial Uses, said Decree being signed by the Honorable Neil F. Graham, Judge, (L. R. Temple, Referee) on the 20th day of February, A. D. 1914, and all as appears of record and on file in this office.

In witness whereof I have hereunto set my hand and affixed the seal of this Court at my office in Fort Collins, Colorado, this 24th day of April, A. D. 1933.

W. P. Hurley, Clerk, by Gertrude Fritz, Deputy.
(Seal District Court, Larimer County, Colorado.)

[fol. 2614] COMPLAINANT'S EXHIBIT No. 85

THE STATE OF WYOMING,
County of Laramie, ss:

I, Edwin W. Burritt, Ex Officio Secretary, State Board of Control, do hereby certify that the annexed copy is a full, true, correct, and complete copy of the Certificates of Appropriation which have been issued, complying with the

Order of the Board of Control, as recorded on page 236 of Order Record 7 and entitled: "In the Matter of the Adjudication of Priorities of the Right of the Use of the Waters of the Big Laramie River and Its Tributaries, being Civil Docket No. 8, Nos. 96 to 107 inclusive, in the District Court, First Judicial District, Laramie County, Wyoming" as the same pertain to Sand Creek and tributaries—tributary of the Laramie River.

Witness my hand and the seal of said Board this 25th day of April, 1933.

Edwin W. Burritt, Ex Officio Secretary. (Seal Board of Control, State of Wyoming.)

THE STATE OF WYOMING

Priority No. 1

Certificate of Appropriation of Water

Certificate Record No. 48, Page 141

WHEREAS, on December 27, 1912 there was entered in the District Court of the First Judicial District within and for Laramie County, State of Wyoming, a decree, and on December 5, 1928 a copy thereof was duly certified to the State Board of Control, which said decree adjudicated certain priorities of the right to the beneficial use of the waters of Big Laramie River and its tributaries, and

WHEREAS, Wyoming Central Land & Improvement Co. presented evidence establishing proof of appropriation of water from Sand Creek, tributary of Laramie River, through Gullihur No. 2 Ditch for irrigation of the lands hereinafter described in Albany County, Wyoming.

NOW KNOW YE, That the State Board of Control, under the provisions of Chapters 65 and 68, Wyoming Compiled Statutes, 1920, and amendments thereto, has, by an order duly made and entered on the 19th day of November, A. D. 1929, in Order Record 7, Page 260, confirmed and established the priority and amount of such appropriation in accordance with said Court Decree, as follows:

Name of Appropriator Wyoming Central Land & Improvement Co.; Postoffice Address Laramie, Wyoming;

Amount of Appropriation 2.8 cu. ft. per sec; Date of Appropriation 1871

Total Acreage One Hundred Ninety-six (196) acres

Description of land irrigated:

TWP	RANGE	SEC.	NE¼				NW¼				SW¼				SE¼				TOTAL
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
14 N	74 W	5				8	Lot3		5	27	40	36	40	40					196

The right to the beneficial use of said water hereby confirmed and established is limited to irrigation and said use is restricted to the place where, and to the purpose for which acquired. Appropriations are limited to the amount of water which is actually applied to beneficial use which in the case of irrigation can not exceed one cubic foot per second of time for each seventy acres of said land.

IN TESTIMONY WHEREOF I, John A. Whiting, President of the State Board of Control, have hereunto set my hand this 30th day of March, A. D. 1932, and caused the seal of said Board to be hereunto affixed.

STATE BOARD OF CONTROL

ATTEST: Grayce E. Eldred
Secretary.

By John A. Whiting
President.

2615

4623

Priority No. 1

THE STATE OF WYOMING

Certificate of Appropriation of Water

Certificate Record No. 48, Page 142

WHEREAS, on December 27, 1912 there was entered in the District Court of the First Judicial District within and for Laramie County, State of Wyoming, a decree, and on December 5, 1928 a copy thereof was duly certified to the State Board of Control, which said decree adjudicated certain priorities of the right to the beneficial use of the waters of Big Laramie River and its tributaries, and

WHEREAS, Wyoming Central Land & Improvement Co. presented evidence establishing proof of appropriation of water from Sand Creek, tributary of Laramie River, through Braden Ditch for irrigation of the lands hereinafter described in Albany County, Wyoming.

NOW KNOW YE, That the State Board of Control, under the provisions of Chapters 65 and 68, Wyoming Compiled Statutes, 1920, and amendments thereto, has, by an order duly made and entered on the 19th day of November, A. D. 19 29, in Order Record 7, Page 260, confirmed and established the priority and amount of such appropriation in accordance with said Court Decree, as follows:

Name of Appropriator Wyoming Central Land & Improvement Co.; Postoffice Address Laramie, Wyoming;

Amount of Appropriation 1.31 cu. ft. per sec; Date of Appropriation 1871

Total Acreage Ninety-two (92) acres

Description of land irrigated:

TWP	RANGE	SEC.	NE¼				NW¼				SW¼				SE¼				TOTAL
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
14 N	74 W	19					16	36 a.	Lot1;		20a.	Lot 2;		18a.	Lot 3				92

The right to the beneficial use of said water hereby confirmed and established is limited to irrigation and said use is restricted to the place where, and to the purpose for which acquired. Appropriations are limited to the amount of water which is actually applied to beneficial use which in the case of irrigation can not exceed one cubic foot per second of time for each seventy acres of said land.

IN TESTIMONY WHEREOF I, John A. Whiting, President of the State Board of Control, have hereunto set my hand this 30th day of March, A. D. 19 32, and caused the seal of said Board to be hereunto affixed.

STATE BOARD OF CONTROL.

ATTEST: Grayce E. Eldred, Secretary.

By John A. Whiting, President.

2616

4624

Priority No. 1

THE STATE OF WYOMING

Certificate of Appropriation of Water

Certificate Record No. 48, Page 143

WHEREAS, on December 27, 1912 there was entered in the District Court of the First Judicial District within and for Laramie County, State of Wyoming, a decree, and on December 5, 1928 a copy thereof was duly certified to the State Board of Control, which said decree adjudicated certain priorities of the right to the beneficial use of the waters of Big Laramie River and its tributaries, and

WHEREAS, Wyoming Central Land & Improvement Co. presented evidence establishing proof of appropriation of water from Sand Creek, tributary of Laramie River, through Nedarb Ditch for irrigation of the lands hereinafter described in Albany County, Wyoming.

NOW KNOW YE, That the State Board of Control, under the provisions of Chapters 65 and 68, Wyoming Compiled Statutes, 1920, and amendments thereto, has, by an order duly made and entered on the 19th day of November, A. D. 1929, in Order Record 7, Page 260, confirmed and established the priority and amount of such appropriation in accordance with said Court Decree, as follows:

Name of Appropriator Wyoming Central Land & Improvement Co.; Postoffice Address Laramie, Wyoming; Amount of Appropriation 1.74 cu. ft. per sec; Date of Appropriation 1871

Total Acreage One Hundred Twenty - two (122) acres

Description of land irrigated:

TWP	RANGE	SEC.	NE¼				NW¼				SW¼				SE¼				TOTAL
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
14 N	74 W	19					24			40	20	20 a. Lot 3			18 a Lot 2				122

The right to the beneficial use of said water hereby confirmed and established is limited to irrigation and domestic purposes and said use is restricted to the place where, and to the purpose for which acquired. Appropriations are limited to the amount of water which is actually applied to beneficial use which in the case of irrigation can not exceed one cubic foot per second of time for each seventy acres of said land.

IN TESTIMONY WHEREOF I, John A. Whiting, President of the State Board of Control, have hereunto set my hand this 30th day of March, A. D. 1932, and caused the seal of said Board to be hereunto affixed.

STATE BOARD OF CONTROL

ATTEST: Grayce E. Eldred, Secretary.

By John A. Whiting, President.

2617

4625

Priority No. 1

THE STATE OF WYOMING

Certificate of Appropriation of Water

Certificate Record No. 48, Page 144

WHEREAS, on December 27, 1912 there was entered in the District Court of the First Judicial District within and for Laramie County, State of Wyoming, a decree, and on December 5, 1928 a copy thereof was duly certified to the State Board of Control, which said decree adjudicated certain priorities of the right to the beneficial use of the waters of Big Laramie River and its tributaries, and

WHEREAS, Wyoming Central Land & Improvement Co. presented evidence establishing proof of appropriation of water from Sand Creek, tributary of Laramie River through Red Ditch for irrigation of the lands hereinafter described in Albany County, Wyoming.

NOW KNOW YE, That the State Board of Control, under the provisions of Chapters 65 and 68, Wyoming Compiled Statutes, 1920, and amendments thereto, has, by an order duly made and entered on the 19th day of November, A. D. 19 29, in Order Record 7, Page 260, confirmed and established the priority and amount of such appropriation in accordance with said Court Decree, as follows:

Name of Appropriator Wyoming Central Land & Improvement Co.; Postoffice Address Laramie, Wyoming; Amount of Appropriation 1.4 cu. ft. per sec; Date of Appropriation 1871

Total Acreage Seventy-three (73) acres

Description of land irrigated:

TWP	RANGE	SEC.	NE¼				NW¼				SW¼				SE¼				TOTAL
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
14 N	74W	17						40	33										73

The right to the beneficial use of said water hereby confirmed and established is limited to irrigation and said use is restricted to the place where, and to the purpose for which acquired. Appropriations are limited to the amount of water which is actually applied to beneficial use which in the case of irrigation can not exceed one cubic foot per second of time for each seventy acres of said land.

IN TESTIMONY WHEREOF I, John A. Whiting, President of the State Board of Control, have hereunto set my hand this 30th day of March, A. D. 1932, and caused the seal of said Board to be hereunto affixed.

STATE BOARD OF CONTROL

ATTEST: Grayce E. Eldred
Secretary.

By John A. Whiting
President.

2618

Priority No. 1

THE STATE OF WYOMING

Certificate of Appropriation of Water

Certificate Record No. 48, Page 145

WHEREAS, on December 27, 1912 there was entered in the District Court of the First Judicial District within and for Laramie County, State of Wyoming, a decree, and on December 5, 1928 a copy thereof was duly certified to the State Board of Control, which said decree adjudicated certain priorities of the right to the beneficial use of the waters of Big Laramie River and its tributaries, and

WHEREAS, Wyoming Central Land & Improvement Co. presented evidence establishing proof of appropriation of water from Sand Creek, tributary of Laramie River, through Gullihur No. 1 Ditch for irrigation of the lands hereinafter described in Albany County, Wyoming.

NOW KNOW YE, That the State Board of Control, under the provisions of Chapters 65 and 68, Wyoming Compiled Statutes, 1920, and amendments thereto, has, by an order duly made and entered on the 19th day of November, A. D. 19 29, in Order Record 7, Page 268, confirmed and established the priority and amount of such appropriation in accordance with said Court Decree, as follows:

Name of Appropriator Wyoming Central Land & Improvement Co.; Postoffice Address Laramie, Wyoming;
Amount of Appropriation 1.69 cu. ft. per sec; Date of Appropriation 1871
Total Acreage One Hundred Eighteen (118) acres
Description of land irrigated:

TWP	RANGE	SEC.	NE¼				NW¼				SW¼				SE¼				TOTAL
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
14 N	74W	5			8	24a.	Lot 2			5	11 a.	Lot 3.				5	17		70
		17	6 a.	Lot 1															6
15 N	74 W	32															32	10	42
																			118

The right to the beneficial use of said water hereby confirmed and established is limited to irrigation and said use is restricted to the place where, and to the purpose for which acquired. Appropriations are limited to the amount of water which is actually applied to beneficial use which in the case of irrigation can not exceed one cubic foot per second of time for each seventy acres of said land.

IN TESTIMONY WHEREOF I, John A. Whiting, President of the State Board of Control, have hereunto set my hand this 30th day of March, A. D. 19 32, and caused the seal of said Board to be hereunto affixed.

STATE BOARD OF CONTROL

ATTEST: Grayce E. Eldred
Secretary.

By John A. Whiting
President.

2619

4631

Priority No. 1

THE STATE OF WYOMING

Certificate of Appropriation of Water

Certificate Record No. 48, Page 146

WHEREAS, on December 27, 1912 there was entered in the District Court of the First Judicial District within and for Laramie County, State of Wyoming, a decree, and on December 5, 1928 a copy thereof was duly certified to the State Board of Control, which said decree adjudicated certain priorities of the right to the beneficial use of the waters of Big Laramie River and its tributaries, and

WHEREAS, Wyoming Central Land & Improvement Co. presented evidence establishing proof of appropriation of water from Sand Creek, tributary of Laramie River, through Richards Ditch for irrigation of the lands hereinafter described in Albany County, Wyoming.

NOW KNOW YE, That the State Board of Control, under the provisions of Chapters 65 and 68, Wyoming Compiled Statutes, 1920, and amendments thereto, has, by an order duly made and entered on the 19th day of November, A. D. 19 29, in Order Record 7, Page 260, confirmed and established the priority and amount of such appropriation in accordance with said Court Decree, as follows:

Name of Appropriator Wyoming Central Land & Improvement Co.; Postoffice Address Laramie, Wyoming; Amount of Appropriation 3.57 cu. ft. per sec; Date of Appropriation 1871

Total Acreage Two Hundred Fifty (250) acres

Description of land irrigated:

TWP	RANGE	SEC.	NE¼				NW¼				SW¼				SE¼				TOTAL
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
14 N	74 W	19	40	40	40	40					20			28		22	20 a.	Lot 4	250

The right to the beneficial use of said water hereby confirmed and established is limited to irrigation and said use is restricted to the place where, and to the purpose for which acquired. Appropriations are limited to the amount of water which is actually applied to beneficial use which in the case of irrigation can not exceed one cubic foot per second of time for each seventy acres of said land.

IN TESTIMONY WHEREOF I, John A. Whiting, President of the State Board of Control, have hereunto set my hand this 30th day of March, A. D. 19 32, and caused the seal of said Board to be hereunto affixed.

STATE BOARD OF CONTROL

ATTEST: Grayce E. Eldred
Secretary.

By John A. Whiting
President.

2620

4619

THE STATE OF WYOMING

Priority No. 2

Certificate of Appropriation of Water

Certificate Record No. 48 Page 147

WHEREAS, on December 27, 1912 there was entered in the District Court of the First Judicial District within and for Laramie County, State of Wyoming, a decree, and on December 5, 1928 a copy thereof was duly certified to the State Board of Control, which said decree adjudicated certain priorities of the right to the beneficial use of the waters of Big Laramie River and its tributaries, and

WHEREAS, James Hardman presented evidence establishing proof of appropriation of water from Sand Creek, tributary of Laramie River through James Hardman No. 2 Ditch for irrigation of the lands hereinafter described in Albany County, Wyoming.

NOW KNOW YE, That the State Board of Control, under the provisions of Chapters 65 and 68, Wyoming Compiled Statutes, 1920, and amendments thereto, has, by an order duly made and entered on the 19th day of November, A. D. 19 29, in Order Record 7, Page 260, confirmed and established the priority and amount of such appropriation in accordance with said Court Decree, as follows:

Name of Appropriator James Hardman; Postoffice Address Laramie, Wyoming;

Amount of Appropriation 1.81 cu. ft. per sec; Date of Appropriation May 1878

Total Acreage One Hundred Twenty-seven (127) acres

Description of land irrigated:

TWP	RANGE	SEC.	NE¼				NW¼				SW¼				SE¼				TOTAL
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
13 N	75 W	2			40									15		40	32		127

The right to the beneficial use of said water hereby confirmed and established is limited to irrigation stock and domestic purposes and said use is restricted to the place where, and to the purpose for which acquired. Appropriations are limited to the amount of water which is actually applied to beneficial use which in the case of irrigation can not exceed one cubic foot per second of time for each seventy acres of said land.

IN TESTIMONY WHEREOF I, John A. Whiting, President of the State Board of Control, have hereunto set my hand this 30th day of March, A. D. 19 32, and caused the seal of said Board to be hereunto affixed.

STATE BOARD OF CONTROL

ATTEST: Grayce B. Eldred
Secretary.

By John A. Whiting
President.

2621

1170

4620

Priority No. 3

THE STATE OF WYOMING

Certificate of Appropriation of Water

Certificate Record No. 48, Page 148

WHEREAS, on December 27, 1912 there was entered in the District Court of the First Judicial District within and for Laramie County, State of Wyoming, a decree, and on December 5, 1928 a copy thereof was duly certified to the State Board of Control, which said decree adjudicated certain priorities of the right to the beneficial use of the waters of Big Laramie River and its tributaries, and

WHEREAS, The Denver-Laramie Realty Co. presented evidence establishing proof of appropriation of water from Sand Creek, tributary of Laramie River through Gullihur No. 2 Ditch for irrigation of the lands hereinafter described in Albany County, Wyoming.

NOW KNOW YE, That the State Board of Control, under the provisions of Chapters 65 and 68, Wyoming Compiled Statutes, 1920, and amendments thereto, has, by an order duly made and entered on the 19th day of November, A. D. 19 29, in Order Record 7, Page 260, confirmed and established the priority and amount of such appropriation in accordance with said Court Decree, as follows:

Name of Appropriator The Denver-Laramie Realty Co.; Postoffice Address Denver, Colorado, Wyoming;

Amount of Appropriation 3.? cu. ft. per sec; Date of Appropriation 1880

Total Acreage Two Hundred Twenty-four (224) acres

Description of land irrigated:

TWP	RANGE	SEC.	NE¼				NW¼				SW¼				SE¼				TOTAL
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
14 N	74W	8					40	40	40	26	10	40	10	18					224

The right to the beneficial use of said water hereby confirmed and established is limited to irrigation and said use is restricted to the place where, and to the purpose for which acquired. Appropriations are limited to the amount of water which is actually applied to beneficial use which in the case of irrigation can not exceed one cubic foot per second of time for each seventy acres of said land.

IN TESTIMONY WHEREOF I, John A. Whiting, President of the State Board of Control, have hereunto set my hand this 30th day of March, A. D. 19 32, and caused the seal of said Board to be hereunto affixed.

STATE BOARD OF CONTROL

ATTEST: Grayce E. Eldred
Secretary.

By John A. Whiting
President.

2622

4621

Priority No. 3

THE STATE OF WYOMING

Certificate of Appropriation of Water

Certificate Record No. 48, Page 149

WHEREAS, on December 27, 1912 there was entered in the District Court of the First Judicial District within and for Laramie County, State of Wyoming, a decree, and on December 5, 1928 a copy thereof was duly certified to the State Board of Control, which said decree adjudicated certain priorities of the right to the beneficial use of the waters of Big Laramie River and its tributaries, and

WHEREAS, J. M. Hoge presented evidence establishing proof of appropriation of water from Sand Creek, tributary of Laramie River through the Red Ditch for irrigation of the lands hereinafter described in Albany County, Wyoming.

NOW KNOW YE, That the State Board of Control, under the provisions of Chapters 65 and 68, Wyoming Compiled Statutes, 1920, and amendments thereto, has, by an order duly made and entered on the 19th day of November, A. D. 1929, in Order Record 7, Page 260, confirmed and established the priority and amount of such appropriation in accordance with said Court Decree, as follows:

Name of Appropriator J. M. Hoge; Postoffice Address Laramie, Wyoming;

Amount of Appropriation 2.95 cu. ft. per sec; Date of Appropriation 1880

Total Acreage Two Hundred Seven (207) acres

Description of land irrigated:

TWP	RANGE	SEC.	NE¼				NW¼				SW¼				SE¼				TOTAL
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
14N	74W	18	40	40	40	40									25				185
		8											22						22
																			207

The right to the beneficial use of said water hereby confirmed and established is limited to irrigation and said use is restricted to the place where, and to the purpose for which acquired. Appropriations are limited to the amount of water which is actually applied to beneficial use which in the case of irrigation can not exceed one cubic foot per second of time for each seventy acres of said land.

IN TESTIMONY WHEREOF I, John A. Whiting, President of the State Board of Control, have hereunto set my hand this 30th day of March, A. D. 1932, and caused the seal of said Board to be hereunto affixed.

STATE BOARD OF CONTROL

ATTEST: Grayce E. Eldred, Secretary.

By John A. Whiting, President.

2623

1172

4627

Priority No. 4

THE STATE OF WYOMING

Certificate of Appropriation of Water

Certificate Record No. 48, Page 150

WHEREAS, on December 27, 1912 there was entered in the District Court of the First Judicial District within and for Laramie County, State of Wyoming, a decree, and on December 5, 1928 a copy thereof was duly certified to the State Board of Control, which said decree adjudicated certain priorities of the right to the beneficial use of the waters of Big Laramie River and its tributaries, and

WHEREAS, J. M. Hoge presented evidence establishing proof of appropriation of water from Sand Creek, tributary of Laramie River through Gullibur No. 1 Ditch for irrigation of the lands hereinafter described in Albany County, Wyoming.

NOW KNOW YE, That the State Board of Control, under the provisions of Chapters 65 and 68, Wyoming Compiled Statutes, 1920, and amendments thereto, has, by an order duly made and entered on the 19th day of November, A. D. 1929, in Order Record 7, Page 260, confirmed and established the priority and amount of such appropriation in accordance with said Court Decree, as follows:

Name of Appropriator J. M. Hoge; Postoffice Address Laramie, Wyoming; Amount of Appropriation 2.51 cu. ft. per sec; Date of Appropriation 1882

Total Acreage One Hundred Seventy-six (176) acres

Description of land irrigated:

TWP	RANGE	SEC.	NE¼				NW¼				SW¼				SE¼				TOTAL
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
14 N	74 W	8												22					22
		8	4	37	39					14	30					30			154
																			176

The right to the beneficial use of said water hereby confirmed and established is limited to irrigation and said use is restricted to the place where, and to the purpose for which acquired. Appropriations are limited to the amount of water which is actually applied to beneficial use which in the case of irrigation can not exceed one cubic foot per second of time for each seventy acres of said land.

IN TESTIMONY WHEREOF I, John A. Whiting, President of the State Board of Control, have hereunto set my hand this 30th day of March, A. D. 1932, and caused the seal of said Board to be hereunto affixed.

STATE BOARD OF CONTROL

ATTEST: Grayce E. Eldred
Secretary.

By John A. Whiting
President.

2624

1173

Priority No. 5

THE STATE OF WYOMING

Certificate of Appropriation of Water

Certificate Record No. 48, Page 151

WHEREAS, on December 27, 1912 there was entered in the District Court of the First Judicial District within and for Laramie County, State of Wyoming, a decree, and on December 5, 1928 a copy thereof was duly certified to the State Board of Control, which said decree adjudicated certain priorities of the right to the beneficial use of the waters of Big Laramie River and its tributaries, and

WHEREAS, Peter Cunningham presented evidence establishing proof of appropriation of water from Sand Creek, tributary of Laramie River through LeRoy Ditch for irrigation of the lands hereinafter described in Albany County, Wyoming.

NOW KNOW YE, That the State Board of Control, under the provisions of Chapters 65 and 68, Wyoming Compiled Statutes, 1920, and amendments thereto, has, by an order duly made and entered on the 19th day of November, A. D. 1929, in Order Record 7, Page 260, confirmed and established the priority and amount of such appropriation in accordance with said Court Decree, as follows:

Name of Appropriator Peter Cunningham; Postoffice Address Laramie, Wyoming;

Amount of Appropriation 8.64 cu. ft. per sec; Date of Appropriation May 1885

Total Acreage Six Hundred Five (605) acres

Description of land irrigated:

TWP	RANGE	SEC.	NE¼				NW¼				SW¼				SE¼				TOTAL
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
14 N	75W	26	40	40	40	40	40	20	40	40	40	40	40	40	40	40	40	25	605

The right to the beneficial use of said water hereby confirmed and established is limited to irrigation and said use is restricted to the place where, and to the purpose for which acquired. Appropriations are limited to the amount of water which is actually applied to beneficial use which in the case of irrigation can not exceed one cubic foot per second of time for each seventy acres of said land.

IN TESTIMONY WHEREOF I, John A. Whiting, President of the State Board of Control, have hereunto set my hand this 30th day of March, A. D. 1932, and caused the seal of said Board to be hereunto affixed.

STATE BOARD OF CONTROL

ATTEST: Grayce E. Eldred
Secretary.

By John A. Whiting
President.

2625

THE STATE OF WYOMING

Priority No. 5

Certificate of Appropriation of Water

Certificate Record No. 48, Page 152

WHEREAS, on December 27, 1912 there was entered in the District Court of the First Judicial District within and for Laramie County, State of Wyoming, a decree, and on December 5, 1928 a copy thereof was duly certified to the State Board of Control, which said decree adjudicated certain priorities of the right to the beneficial use of the waters of Big Laramie River and its tributaries, and

WHEREAS, John Goetz presented evidence establishing proof of appropriation of water from Sand Creek, tributary of Laramie River through Davis Bros. No. 1 Ditch for irrigation of the lands hereinafter described in Albany County, Wyoming.

NOW KNOW YE, That the State Board of Control, under the provisions of Chapters 65 and 68, Wyoming Compiled Statutes, 1920, and amendments thereto, has, by an order duly made and entered on the 19th day of November, A. D. 19 29, in Order Record 7, Page 260, confirmed and established the priority and amount of such appropriation in accordance with said Court Decree, as follows:

Name of Appropriator John Goetz; Postoffice Address Laramie, Wyoming;

Amount of Appropriation 3.65 cu. ft. per sec; Date of Appropriation May 1885

Total Acreage Two Hundred Fifty-six (256) acres

Description of land irrigated:

TWP	RANGE	SEC.	NE¼				NW¼				SW¼				SE¼				TOTAL
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
13 N	75 W	14	40			20													60
		13					12	32											44
		12										40	40	12					92
		11													30			30	60
																			256 acres

The right to the beneficial use of said water hereby confirmed and established is limited to irrigation ~~and stock purposes~~ and said use is restricted to the place where, and to the purpose for which acquired. Appropriations are limited to the amount of water which is actually applied to beneficial use which in the case of irrigation can not exceed one cubic foot per second of time for each seventy acres of said land.

IN TESTIMONY WHEREOF I, John A. Whiting, President of the State Board of Control, have hereunto set my hand this 30th day of March, A. D. 19 32, and caused the seal of said Board to be hereunto affixed.

STATE BOARD OF CONTROL

ATTEST: Grayce E. Eldred
Secretary.

By John A. Whiting
President.

2626

THE STATE OF WYOMING

Priority No. 6

Certificate of Appropriation of Water

Certificate Record No. 48, Page 153

WHEREAS, on December 27, 1912 there was entered in the District Court of the First Judicial District within and for Laramie County, State of Wyoming, a decree, and on December 5, 1928 a copy thereof was duly certified to the State Board of Control, which said decree adjudicated certain priorities of the right to the beneficial use of the waters of Big Laramie River and its tributaries, and

WHEREAS, The Denver-Laramie Realty Co. presented evidence establishing proof of appropriation of water from Sand Creek, tributary of Laramie River through LeRoy Ditch for irrigation of the lands hereinafter described in Albany County, Wyoming.

NOW KNOW YE, That the State Board of Control, under the provisions of Chapters 65 and 68, Wyoming Compiled Statutes, 1920, and amendments thereto, has, by an order duly made and entered on the 19th day of November, A. D. 1929, in Order Record 7, Page 260, confirmed and established the priority and amount of such appropriation in accordance with said Court Decree, as follows:

Name of Appropriator The Denver-Laramie Realty Co.; Postoffice Address Denver, Colorado, Wyoming;

Amount of Appropriation 4.97 cu. ft. per sec; Date of Appropriation Spring 1885

Total Acreage Three Hundred Forty-eight (348) acres

Description of land irrigated:

TWP	RANGE	SEC.	NE¼				NW¼				SW¼				SE¼				TOTAL
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
14 N	75 W	35	19	40	38	18	40	40	40	40	15	4				31	23		348

The right to the beneficial use of said water hereby confirmed and established is limited to irrigation and said use is restricted to the place where, and to the purpose for which acquired. Appropriations are limited to the amount of water which is actually applied to beneficial use which in the case of irrigation can not exceed one cubic foot per second of time for each seventy acres of said land.

IN TESTIMONY WHEREOF I, John A. Whiting, President of the State Board of Control, have hereunto set my hand this 30th day of March, A. D. 19 32, and caused the seal of said Board to be hereunto affixed.

STATE BOARD OF CONTROL

ATTEST: Grayce E. Eldred, Secretary.

By John A. Whiting, President.

2627

4632 1176

THE STATE OF WYOMING

Priority No. 7

Certificate of Appropriation of Water

Certificate Record No. 48, Page 154

WHEREAS, on December 27, 1912 there was entered in the District Court of the First Judicial District within and for Laramie County, State of Wyoming, a decree, and on December 5, 1928 a copy thereof was duly certified to the State Board of Control, which said decree adjudicated certain priorities of the right to the beneficial use of the waters of Big Laramie River and its tributaries, and

WHEREAS, William Konold presented evidence establishing proof of appropriation of water from Sand Creek, tributary of Laramie River through William Konold Ditch for irrigation of the lands hereinafter described in Albany County, Wyoming.

NOW KNOW YE, That the State Board of Control, under the provisions of Chapters 65 and 68, Wyoming Compiled Statutes, 1920, and amendments thereto, has, by an order duly made and entered on the 19th day of November, A. D. 19 29, in Order Record 7, Page 260, confirmed and established the priority and amount of such appropriation in accordance with said Court Decree, as follows:

Name of Appropriator William Konold; Postoffice Address Springville, Utah, Wyoming;

Amount of Appropriation 4.57 cu. ft. per sec; Date of Appropriation April 1886

Total Acreage Three Hundred Twenty (320) acres

Description of land irrigated:

TWP	RANGE	SEC.	NE¼				NW¼				SW¼				SE¼				TOTAL
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
13 N	75W	14							40	40	40	40		20	---140------				320

The right to the beneficial use of said water hereby confirmed and established is limited to irrigation domestic and stock purposes and said use is restricted to the place where, and to the purpose for which acquired. Appropriations are limited to the amount of water which is actually applied to beneficial use which in the case of irrigation can not exceed one cubic foot per second of time for each seventy acres of said land.

IN TESTIMONY WHEREOF I, John A. Whiting, President of the State Board of Control, have hereunto set my hand this 30th day of March, A. D. 19 32, and caused the seal of said Board to be hereunto affixed.

STATE BOARD OF CONTROL

ATTEST: Grayce P. Eldred
Secretary.

By John A. Whiting
President.

2628

THE STATE OF WYOMING

Priority No. 7

Certificate of Appropriation of Water

Certificate Record No. 48, Page 155

WHEREAS, on December 27, 1912 there was entered in the District Court of the First Judicial District within and for Laramie County, State of Wyoming, a decree, and on December 5, 1928 a copy thereof was duly certified to the State Board of Control, which said decree adjudicated certain priorities of the right to the beneficial use of the waters of Big Laramie River and its tributaries, and

WHEREAS, Nicholas Lundquist presented evidence establishing proof of appropriation of water from Sand Creek, tributary of Laramie River through Konold Ditch for irrigation of the lands hereinafter described in Albany County, Wyoming.

NOW KNOW YE, That the State Board of Control, under the provisions of Chapters 65 and 68, Wyoming Compiled Statutes, 1920, and amendments thereto, has, by an order duly made and entered on the 19th day of November, A. D. 1929, in Order Record 7, Page 260, confirmed and established the priority and amount of such appropriation in accordance with said Court Decree, as follows:

Name of Appropriator Nicholas Lundquist; Postoffice Address Laramie, Wyoming;

Amount of Appropriation 1.11 cu. ft. per sec; Date of Appropriation April 1886

Total Acreage Seventy-eight (78) acres

Description of land irrigated:

TWP	RANGE	SEC.	NE¼				NW¼				SW¼				SE¼				TOTAL
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
13 N	74W	30							18	15									33
13 N	75 W	25			30	15													45
																			78

The right to the beneficial use of said water hereby confirmed and established is limited to irrigation and said use is restricted to the place where, and to the purpose for which acquired. Appropriations are limited to the amount of water which is actually applied to beneficial use which in the case of irrigation can not exceed one cubic foot per second of time for each seventy acres of said land.

IN TESTIMONY WHEREOF I, John A. Whiting, President of the State Board of Control, have hereunto set my hand this 30th day of March, A. D. 1932, and caused the seal of said Board to be hereunto affixed.

STATE BOARD OF CONTROL

ATTEST: Grayce E. Eldred
Secretary.

By John A. Whiting
President.

2629

4634

Priority No. 8

THE STATE OF WYOMING

Certificate of Appropriation of Water

Certificate Record No. 48, Page 156

WHEREAS, on December 27, 1912 there was entered in the District Court of the First Judicial District within and for Laramie County, State of Wyoming, a decree, and on December 5, 1928 a copy thereof was duly certified to the State Board of Control, which said decree adjudicated certain priorities of the right to the beneficial use of the waters of Big Laramie River and its tributaries, and

WHEREAS, F. B. Collins presented evidence establishing proof of appropriation of water from Sand Creek, tributary of Lara ie River through Collins Ditch No. 4. for irrigation of the lands hereinafter described in Albany County, Wyoming.

NOW KNOW YE, That the State Board of Control, under the provisions of Chapters 65 and 68, Wyoming Compiled Statutes, 1920, and amendments thereto, has, by an order duly made and entered on the ~~10th~~ day of November, A. D. 1929, in Order Record 7, Page 260, confirmed and established the priority and amount of such appropriation in accordance with said Court Decree, as follows:

Name of Appropriator F. B. Collins; Postoffice Address Laramie, Wyoming;

Amount of Appropriation .37 cu. ft. per sec: Date of Appropriation 1887

Total Acreage Twenty-six (26) acres

Description of land irrigated:

TWP	RANGE	SEC.	NE¼				NW¼				SW¼				SE¼				TOTAL
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
12 N	74 W	7						4											4
		6										4	18						22
																			26

The right to the beneficial use of said water hereby confirmed and established is limited to irrigation and said use is restricted to the place where, and to the purpose for which acquired. Appropriations are limited to the amount of water which is actually applied to beneficial use which in the case of irrigation can not exceed one cubic foot per second of time for each seventy acres of said land.

IN TESTIMONY WHEREOF I, John A. Whiting, President of the State Board of Control, have hereunto set my hand this 30th day of March, A. D. 1932, and caused the seal of said Board to be hereunto affixed.

STATE BOARD OF CONTROL

ATTEST: Grayce E. Eldred
Secretary.

By John A. Whiting
President.

2630

1179

4635

Priority No. 9

THE STATE OF WYOMING

Certificate of Appropriation of Water

Certificate Record No. 48, Page 157

WHEREAS, on December 27, 1912 there was entered in the District Court of the First Judicial District within and for Laramie County, State of Wyoming, a decree, and on December 5, 1928 a copy thereof was duly certified to the State Board of Control, which said decree adjudicated certain priorities of the right to the beneficial use of the waters of Big Laramie River and its tributaries, and

WHEREAS, J. M. Hoge presented evidence establishing proof of appropriation of water from Sand Creek, tributary of Laramie River through Richards Ditch for irrigation of the lands hereinafter described in Albany County, Wyoming.

NOW KNOW YE, That the State Board of Control, under the provisions of Chapters 65 and 68, Wyoming Compiled Statutes, 1920, and amendments thereto, has, by an order duly made and entered on the 19th day of November, A. D. 19 29, in Order Record 7, Page 261, confirmed and established the priority and amount of such appropriation in accordance with said Court Decree, as follows:

Name of Appropriator J. M. Hoge; Postoffice Address Laramie, Wyoming;

Amount of Appropriation .64 cu. ft. per sec; Date of Appropriation 1888

Total Acreage Forty-five (45) acres

Description of land irrigated:

TWP	RANGE	SEC.	NE¼				NW¼				SW¼				SE¼				TOTAL
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
14 N	74 W	20						10	20										30
		18																15	15
																			45

The right to the beneficial use of said water hereby confirmed and established is limited to irrigation and said use is restricted to the place where, and to the purpose for which acquired. Appropriations are limited to the amount of water which is actually applied to beneficial use which in the case of irrigation can not exceed one cubic foot per second of time for each seventy acres of said land.

IN TESTIMONY WHEREOF I, John A. Whiting, President of the State Board of Control, have hereunto set my hand this 30th day of March, A. D. 19 32, and caused the seal of said Board to be hereunto affixed.

STATE BOARD OF CONTROL

ATTEST: Grayce E. Eldred
Secretary.

By John A. Whiting
President.

2631

THE STATE OF WYOMING

Priority No. 10

Certificate of Appropriation of Water

Certificate Record No. 48, Page 158

WHEREAS, on December 27, 1912 there was entered in the District Court of the First Judicial District within and for Laramie County, State of Wyoming, a decree, and on December 5, 1928 a copy thereof was duly certified to the State Board of Control, which said decree adjudicated certain priorities of the right to the beneficial use of the waters of Big Laramie River and its tributaries, and

WHEREAS, John Goetz presented evidence establishing proof of appropriation of water from Sand Creek, tributary of Laramie River through Lone Tree Ditch for irrigation of the lands hereinafter described in Albany County, Wyoming.

NOW KNOW YE, That the State Board of Control, under the provisions of Chapters 65 and 68, Wyoming Compiled Statutes, 1920, and amendments thereto, has, by an order duly made and entered on the 19th day of November, A. D. 1929, in Order Record 7, Page 261, confirmed and established the priority and amount of such appropriation in accordance with said Court Decree, as follows:

Name of Appropriator John Goetz; Postoffice Address Laramie, Wyoming;

Amount of Appropriation 5.68 cu. ft. per sec; Date of Appropriation March 1890

Total Acreage Three Hundred Ninety-eight (398) acres.

Description of land irrigated:

TWP	RANGE	SEC.	NE¼				NW¼				SW¼				SE¼				TOTAL
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
13 N	75 W	24									35			25					60
		24		30	30						40			35					135
		13					15		40	20	38	40	25	25					203
																			398

The right to the beneficial use of said water hereby confirmed and established is limited to irrigation and stock purposes and said use is restricted to the place where, and to the purpose for which acquired. Appropriations are limited to the amount of water which is actually applied to beneficial use which in the case of irrigation can not exceed one cubic foot per second of time for each seventy acres of said land.

IN TESTIMONY WHEREOF I, John A. Whiting, President of the State Board of Control, have hereunto set my hand this 30th day of March, A. D. 1932, and caused the seal of said Board to be hereunto affixed.

STATE BOARD OF CONTROL

ATTEST: Grayce E. Eldred
Secretary.

By John A. Whiting
President.

2632

THE STATE OF WYOMING

Priority No. 11.

Certificate of Appropriation of Water

Certificate Record No. 48, Page 159

WHEREAS, on December 27, 1912 there was entered in the District Court of the First Judicial District within and for Laramie County, State of Wyoming, a decree, and on December 5, 1928 a copy thereof was duly certified to the State Board of Control, which said decree adjudicated certain priorities of the right to the beneficial use of the waters of Big Laramie River and its tributaries, and

WHEREAS, F. B. Collins presented evidence establishing proof of appropriation of water from Sand Creek, tributary of Laramie River through Colline Ditch for irrigation of the lands hereinafter described in Albany County, Wyoming.

NOW KNOW YE, That the State Board of Control, under the provisions of Chapters 65 and 68, Wyoming Compiled Statutes, 1920, and amendments thereto, has, by an order duly made and entered on the 19th day of November, A. D. 19 29, in Order Record 7, Page 261, confirmed and established the priority and amount of such appropriation in accordance with said Court Decree, as follows:

Name of Appropriator F. B. Collins; Postoffice Address Laramie, Wyoming;

Amount of Appropriation .79 cu. ft. per sec; Date of Appropriation 1890

Total Acreage Fifty-five (55) acres

Description of land irrigated:

TWP	RANGE	SEC.	NE¼				NW¼				SW¼				SE¼				TOTAL
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
12 N	74 W	7						18											18
12 N	75 W	12	5		10	5					10					7			37
																			55

The right to the beneficial use of said water hereby confirmed and established is limited to irrigation and said use is restricted to the place where, and to the purpose for which acquired. Appropriations are limited to the amount of water which is actually applied to beneficial use which in the case of irrigation can not exceed one cubic foot per second of time for each seventy acres of said land.

IN TESTIMONY WHEREOF I, John A. Whiting, President of the State Board of Control, have hereunto set my hand this 30th day of March, A. D. 19 32 and caused the seal of said Board to be hereunto affixed.

STATE BOARD OF CONTROL

ATTEST: Grayce E. Eldred
Secretary.

By John A. Whiting.
President.

2633

4638

1182

THE STATE OF WYOMING

Priority No. 12.

Certificate of Appropriation of Water

Certificate Record No. 48, Page 160

WHEREAS, on December 27, 1912 there was entered in the District Court of the First Judicial District within and for Laramie County, State of Wyoming, a decree, and on December 5, 1928 *a copy thereof was duly certified to the State Board of Control, which said decree* adjudicated certain priorities of the right to the beneficial use of the waters of Big Laramie River and its tributaries, and

WHEREAS, Alice Hardman presented evidence establishing proof of appropriation of water from Sand Creek, tributary of Laramie River through Davis Bros. No. 2 & Alice Hardman for irrigation of the lands hereinafter described in Albany County, Wyoming.

NOW KNOW YE, That the State Board of Control, under the provisions of Chapters 65 and 68, Wyoming Compiled Statutes, 1920, and amendments thereto, has, by an order duly made and entered on the 19th day of November, A. D. 1929, in Order Record 7, Page 261, confirmed and established the priority and amount of such appropriation in accordance with said Court Decree, as follows:

Name of Appropriator Alice Hardman; Postoffice Address Laramie, Wyoming;

Amount of Appropriation 4.57 cu. ft. per sec; Date of Appropriation August 8, 1891

Total Acreage Three Hundred Twenty (320) acres

Description of land irrigated:

TWP	RANGE	SEC.	NE¼				NW¼				SW¼				SE¼				TOTAL
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
13 N	75 W	2		40			40	40	40	40	40	40	40						320

The right to the beneficial use of said water hereby confirmed and established is limited to irrigation and stock purposes and said use is restricted to the place where, and to the purpose for which acquired. Appropriations are limited to the amount of water which is actually applied to beneficial use which in the case of irrigation can not exceed one cubic foot per second of time for each seventy acres of said land.

IN TESTIMONY WHEREOF I, John A. Whiting, President of the State Board of Control, have hereunto set my hand this 30th day of March, A. D. 1932, and caused the seal of said Board to be hereunto affixed.

STATE BOARD OF CONTROL

ATTEST: Grayce E. Kldred
Secretary.

By John A. Whiting.
President.

2634

1639

Priority No. 13.

THE STATE OF WYOMING

Certificate of Appropriation of Water

Certificate Record No. 48, Page 161

WHEREAS, on December 27, 1912 there was entered in the District Court of the First Judicial District within and for Laramie County, State of Wyoming, a decree, and on December 5, 1928 a copy thereof was duly certified to the State Board of Control, which said decree adjudicated certain priorities of the right to the beneficial use of the waters of Big Laramie River and its tributaries, and

WHEREAS, J. M. Hoge presented evidence establishing proof of appropriation of water from Sand Creek, tributary of Laramie River, through Lone Tree or Antelope Ditch for irrigation of the lands hereinafter described in Albany County, Wyoming.

NOW KNOW YE, That the State Board of Control, under the provisions of Chapters 65 and 68, Wyoming Compiled Statutes, 1920, and amendments thereto, has, by an order duly made and entered on the 19th day of November, A. D. 19 29 in Order Record 7, Page 261, confirmed and established the priority and amount of such appropriation in accordance with said Court Decree, as follows:

Name of Appropriator J. M. Hoge; Postoffice Address Laramie, Wyoming; Amount of Appropriation 5.85 cu. ft. per sec; Date of Appropriation March 17, 1894

Total Acreage Four Hundred Ten (410) acres.

Description of land irrigated:

TWP	RANGE	SEC.	NE¼				NW¼				SW¼				SE¼				TOTAL
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
14 N	74 W	30	40	40	40	40				40	40			40		35			315
		20	30 a. Lot 2																30
		31					25	20 a. Lot 1;			20 a. Lot 2:								65
																			410

The right to the beneficial use of said water hereby confirmed and established is limited to irrigation and domestic purposes and said use is restricted to the place where, and to the purpose for which acquired. Appropriations are limited to the amount of water which is actually applied to beneficial use which in the case of irrigation can not exceed one cubic foot per second of time for each seventy acres of said land.

IN TESTIMONY WHEREOF I, John A. Whiting, President of the State Board of Control, have hereunto set my hand this 30th day of March, A. D. 19 32, and caused the seal of said Board to be hereunto affixed.

STATE BOARD OF CONTROL

ATTEST: Grayce E. Eldred
Secretary.

By John A. Whiting.
President.

2635

4640 1184

THE STATE OF WYOMING

Priority No. 14.

Certificate of Appropriation of Water

Certificate Record No. 48, Page 162

WHEREAS, on December 27, 1912 there was entered in the District Court of the First Judicial District within and for Laramie County, State of Wyoming, a decree, and on December 5, 1928 a copy thereof was duly certified to the State Board of Control, which said decree adjudicated certain priorities of the right to the beneficial use of the waters of Big Laramie River and its tributaries, and

WHEREAS, Alice Hardman presented evidence establishing proof of appropriation of water from Sand Creek, tributary of Laramie River, through Davis Bros. Sand Creek No. 2 for irrigation of the lands hereinafter described in Albany County, Wyoming.

NOW KNOW YE, That the State Board of Control, under the provisions of Chapters 65 and 68, Wyoming Compiled Statutes, 1920, and amendments thereto, has, by an order duly made and entered on the 19th day of November, A. D. 19 29, in Order Record 7, Page 261, confirmed and established the priority and amount of such appropriation in accordance with said Court Decree, as follows:

Name of Appropriator Alice Hardman; Postoffice Address Laramie, Wyoming; Amount of Appropriation 1.78 cu. ft. per sec; Date of Appropriation November 26, 1894

Total Acreage One Hundred Twenty-five (125) acres

Description of land irrigated:

TWP	RANGE	SEC.	NE¼				NW¼				SW¼				SE¼				TOTAL
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
13 N	75 W	11		5			40	40	30	10									125

The right to the beneficial use of said water hereby confirmed and established is limited to irrigation and said use is restricted to the place where, and to the purpose for which acquired. Appropriations are limited to the amount of water which is actually applied to beneficial use which in the case of irrigation can not exceed one cubic foot per second of time for each seventy acres of said land.

IN TESTIMONY WHEREOF I, John A. Whiting, President of the State Board of Control, have hereunto set my hand this 30th day of March, A. D. 19 32, and caused the seal of said Board to be hereunto affixed.

STATE BOARD OF CONTROL

ATTEST: Grayce E. Eldred
Secretary.

By John A. Whiting
President.

2636

4641

THE STATE OF WYOMING

Priority No. 15.

Certificate of Appropriation of Water

Certificate Record No. 48, Page 163

WHEREAS, on December 27, 1912 there was entered in the District Court of the First Judicial District within and for Laramie County, State of Wyoming, a decree, and on December 5, 1928 a copy thereof was duly certified to the State Board of Control, which said decree adjudicated certain priorities of the right to the beneficial use of the waters of Big Laramie River and its tributaries, and

WHEREAS, L. J. Bush presented evidence establishing proof of appropriation of water from Sand Creek, tributary of Laramie River, through Bush No. 1 Ditch for irrigation of the lands hereinafter described in Albany County, Wyoming.

NOW KNOW YE, That the State Board of Control, under the provisions of Chapters 65 and 68, Wyoming Compiled Statutes, 1920, and amendments thereto, has, by an order duly made and entered on the 19th day of November, A. D. 1929, in Order Record 7, Page 261, confirmed and established the priority and amount of such appropriation in accordance with said Court Decree, as follows:

Name of Appropriator L. J. Bush; Postoffice Address Laramie, Wyoming; Amount of Appropriation 2.28 cu. ft. per sec; Date of Appropriation July 24 1897

Total Acreage One Hundred Fifty (150) acres

Description of land irrigated:

TWP	RANGE	SEC.	NE¼				NW¼				SW¼				SE¼				TOTAL
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
14 N	75 W	24													40	40	40	30	150

The right to the beneficial use of said water hereby confirmed and established is limited to irrigation and said use is restricted to the place where, and to the purpose for which acquired. Appropriations are limited to the amount of water which is actually applied to beneficial use which in the case of irrigation can not exceed one cubic foot per second of time for each seventy acres of said land.

IN TESTIMONY WHEREOF I, John A. Whiting, President of the State Board of Control, have hereunto set my hand this 30th day of March, A. D. 1938, and caused the seal of said Board to be hereunto affixed.

STATE BOARD OF CONTROL

ATTEST: Grayce E. Kldred
Secretary.

By John A. Whiting.
President.

2637

4642

THE STATE OF WYOMING

Priority No. 16.

Certificate of Appropriation of Water

Certificate Record No. 42, Page 164

WHEREAS. on December 27, 1912 there was entered in the District Court of the First Judicial District within and for Laramie County, State of Wyoming, a decree, and on December 5, 1928 a copy thereof was duly certified to the State Board of Control, which said decree adjudicated certain priorities of the right to the beneficial use of the waters of Big Laramie River and its tributaries, and

WHEREAS, John Goetz presented evidence establishing proof of appropriation of water from Sand Creek, tributary of Laramie River, through Davis Bros. No. 2 Ditch for irrigation of the lands hereinafter described in Albany County, Wyoming.

NOW KNOW YE, That the State Board of Control, under the provisions of Chapters 65 and 68, Wyoming Compiled Statutes, 1920, and amendments thereto, has, by an order duly made and entered on the 19th day of November, A. D. 1929, in Order Record 7, Page 261, confirmed and established the priority and amount of such appropriation in accordance with said Court Decree, as follows:

Name of Appropriator John Goetz; Postoffice Address Laramie, Wyoming;

Amount of Appropriation 2.85 cu. ft. per sec; Date of Appropriation May 28, 1900

Total Acreage Two Hundred (200) acres

Description of land irrigated:

TWP	RANGE	SEC.	NE¼				NW¼				SW¼				SE¼				TOTAL
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
13 N	75 W	14		20	20										20	10		20	90
		11														30	20		50
		13						25	15	5			15						60
																			200

The right to the beneficial use of said water hereby confirmed and established is limited to irrigation and said use is restricted to the place where, and to the purpose for which acquired. Appropriations are limited to the amount of water which is actually applied to beneficial use which in the case of irrigation can not exceed one cubic foot per second of time for each seventy acres of said land.

IN TESTIMONY WHEREOF I, John A. Whiting, President of the State Board of Control, have hereunto set my hand this 30th day of March, A. D. 1932, and caused the seal of said Board to be hereunto affixed.

STATE BOARD OF CONTROL

ATTEST: Grayce E. Kldred
Secretary.

By John A. Whiting.
President.

2638

4684

THE STATE OF WYOMING

Priority No. 1.

Certificate of Appropriation of Water

Certificate Record No. 48, Page 207

WHEREAS, on December 27, 1912 there was entered in the District Court of the First Judicial District within and for Laramie County, State of Wyoming, a decree, and on December 5, 1928 a copy thereof was duly certified to the State Board of Control, which said decree adjudicated certain priorities of the right to the beneficial use of the waters of Big Laramie River and its tributaries, and

WHEREAS, Diana Brown presented evidence establishing proof of appropriation of water from Dry Creek, tributary of Shell Creek, through Dry Creek Ditch No. 2 for irrigation of the lands hereinafter described in Albany County, Wyoming.

NOW KNOW YE, That the State Board of Control, under the provisions of Chapters 65 and 68, Wyoming Compiled Statutes, 1920, and amendments thereto, has, by an order duly made and entered on the 19th day of November, A. D. 19 29, in Order Record 7, Page 264, confirmed and established the priority and amount of such appropriation in accordance with said Court Decree, as follows:

Name of Appropriator Diana Brown; Postoffice Address Laramie, Wyoming;

Amount of Appropriation 2.43 cu. ft. per sec; Date of Appropriation March 1876

Total Acreage One Hundred Seventy (170) acres

Description of land irrigated:

TWP	RANGE	SEC.	NE¼				NW¼				SW¼				SE¼				TOTAL
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
13 N	75 W	27	40		20	20					20			30		25	15		170

The right to the beneficial use of said water hereby confirmed and established is limited to irrigation and said use is restricted to the place where, and to the purpose for which acquired. Appropriations are limited to the amount of water which is actually applied to beneficial use which in the case of irrigation can not exceed one cubic foot per second of time for each seventy acres of said land.

IN TESTIMONY WHEREOF I, John A. Whiting, President of the State Board of Control, have hereunto set my hand this 30th day of March, A. D. 19 32, and caused the seal of said Board to be hereunto affixed.

STATE BOARD OF CONTROL

ATTEST: Grayce E. Kildred
Secretary.

By John A. Whiting
President.

2639

4685

THE STATE OF WYOMING

Priority No. 2.

Certificate of Appropriation of Water

Certificate Record No. 48, Page 208

WHEREAS, on December 27, 1912 there was entered in the District Court of the First Judicial District within and for Laramie County, State of Wyoming, a decree, and on December 5, 1928 a copy thereof was duly certified to the State Board of Control, which said decree adjudicated certain priorities of the right to the beneficial use of the waters of Big Laramie River and its tributaries, and

WHEREAS, Diana Brown presented evidence establishing proof of appropriation of water from Dry Creek, tributary of Shell Creek, through Dry Creek Ditch No. 1. for irrigation of the lands hereinafter described in Albany County, Wyoming.

NOW KNOW YE, That the State Board of Control, under the provisions of Chapters 65 and 68, Wyoming Compiled Statutes, 1920, and amendments thereto, has, by an order duly made and entered on the 19th day of November, A. D. 19 29, in Order Record 7, Page 264, confirmed and established the priority and amount of such appropriation in accordance with said Court Decree, as follows:

Name of Appropriator Diana Brown; Postoffice Address Laramie, Wyoming;

Amount of Appropriation 2.02 cu. ft. per sec; Date of Appropriation April 1876

Total Acreage One Hundred Forty-five (145) acres

Description of land irrigated:

TWP	RANGE	SEC.	NE¼				NW¼				SW¼				SE¼				TOTAL
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
13N	75 W	27				20									40	10	20	20	110
		26						15	20										35
																			145

The right to the beneficial use of said water hereby confirmed and established is limited to irrigation and said use is restricted to the place where, and to the purpose for which acquired. Appropriations are limited to the amount of water which is actually applied to beneficial use which in the case of irrigation can not exceed one cubic foot per second of time for each seventy acres of said land.

IN TESTIMONY WHEREOF I, John A. Whiting, President of the State Board of Control, have hereunto set my hand this 30th day of March, A. D. 19 32, and caused the seal of said Board to be hereunto affixed.

STATE BOARD OF CONTROL

ATTEST: Grayce E. Kildred
Secretary.

By John A. Whiting.
President.

2640

4643

THE STATE OF WYOMING

Priority No. 1.

Certificate of Appropriation of Water

Certificate Record No. 48, Page 181

WHEREAS, on December 27, 1912 there was entered in the District Court of the First Judicial District within and for Laramie County, State of Wyoming, a decree, and on December 5, 1928 a copy thereof was duly certified to the State Board of Control, which said decree adjudicated certain priorities of the right to the beneficial use of the waters of Big Laramie River and its tributaries, and

WHEREAS, A. H. Johnson presented evidence establishing proof of appropriation of water from Antelope Creek, tributary of Sand Creek, through Antelope No. 3 Ditch for irrigation of the lands hereinafter described in Albany County, Wyoming.

NOW KNOW YE, That the State Board of Control, under the provisions of Chapters 65 and 68, Wyoming Compiled Statutes, 1920, and amendments thereto, has, by an order duly made and entered on the 19th day of November, A. D. 1929, in Order Record 7, Page 265, confirmed and established the priority and amount of such appropriation in accordance with said Court Decree, as follows:

Name of Appropriator A. H. Johnson; Postoffice Address Laramie, Wyoming;

Amount of Appropriation .64 cu. ft. per sec; Date of Appropriation April 1885

Total Acreage Forty-five (45) acres

Description of land irrigated:

TWP	RANGE	SEC.	NE¼				NW¼				SW¼				SE¼				TOTAL
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
12 N	74 W	24									30			15					45

The right to the beneficial use of said water hereby confirmed and established is limited to irrigation and stock purposes and said use is restricted to the place where, and to the purpose for which acquired. Appropriations are limited to the amount of water which is actually applied to beneficial use which in the case of irrigation can not exceed one cubic foot per second of time for each seventy acres of said land.

IN TESTIMONY WHEREOF I, John A. Whiting, President of the State Board of Control, have hereunto set my hand this 30th day of March, A. D. 1932, and caused the seal of said Board to be hereunto affixed.

STATE BOARD OF CONTROL

ATTEST: Grayce E. Eldred, Secretary.

By John A. Whiting, President.

2641

4644 1190

THE STATE OF WYOMING

Priority No. 1.

Certificate of Appropriation of Water

Certificate Record No. 48, Page 182

WHEREAS, on December 27, 1912 there was entered in the District Court of the First Judicial District within and for Laramie County, State of Wyoming, a decree, and on December 5, 1928 a copy thereof was duly certified to the State Board of Control, which said decree adjudicated certain priorities of the right to the beneficial use of the waters of Big Laramie River and its tributaries, and

WHEREAS, A. H. Johnson presented evidence establishing proof of appropriation of water from Antelope Creek, tributary of Sand Creek, through "A. J." Ditch for irrigation of the lands hereinafter described in Albany County, Wyoming.

NOW KNOW YE, That the State Board of Control, under the provisions of Chapters 65 and 68, Wyoming Compiled Statutes, 1920, and amendments thereto, has, by an order duly made and entered on the 19th day of November, A. D. 19 29, in Order Record 7, Page 263, confirmed and established the priority and amount of such appropriation in accordance with said Court Decree, as follows:

Name of Appropriator A. H. Johnson; Postoffice Address Laramie, Wyoming;

Amount of Appropriation 1.42 cu. ft. per sec; Date of Appropriation April 1885

Total Acreage One Hundred (100) acres

Description of land irrigated:

TWP	RANGE	SEC.	NE¼				NW¼				SW¼				SE¼				TOTAL
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
13 N	74 W	28									40			40		15	5		100

The right to the beneficial use of said water hereby confirmed and established is limited to irrigation and stock purposes and said use is restricted to the place where, and to the purpose for which acquired. Appropriations are limited to the amount of water which is actually applied to beneficial use which in the case of irrigation can not exceed one cubic foot per second of time for each seventy acres of said land.

IN TESTIMONY WHEREOF I, John A. Whiting, President of the State Board of Control, have hereunto set my hand this 30th day of March, A. D. 19 32, and caused the seal of said Board to be hereunto affixed.

STATE BOARD OF CONTROL

ATTEST: Grayce E. Eldred
Secretary.

By John A. Whiting
President.

2642

Priority No. 1.

THE STATE OF WYOMING

Certificate of Appropriation of Water

Certificate Record No. 48, Page 183

WHEREAS, on December 27, 1912 there was entered in the District Court of the First Judicial District within and for Laramie County, State of Wyoming, a decree, and on December 5, 1928 a copy thereof was duly certified to the State Board of Control, which said decree adjudicated certain priorities of the right to the beneficial use of the waters of Big Laramie River and its tributaries, and

WHEREAS, A. H. Johnson presented evidence establishing proof of appropriation of water from Antelope Creek, tributary of Sand Creek, through Home Ditch for irrigation of the lands hereinafter described in Albany County, Wyoming.

NOW KNOW YE, That the State Board of Control, under the provisions of Chapters 65 and 68, Wyoming Compiled Statutes, 1920, and amendments thereto, has, by an order duly made and entered on the 19th day of November, A. D. 1929, in Order Record 7, Page 263, confirmed and established the priority and amount of such appropriation in accordance with said Court Decree, as follows:

Name of Appropriator A. H. Johnson; Postoffice Address Laramie, Wyoming; Amount of Appropriation .28 cu. ft. per sec; Date of Appropriation April 1885

Total Acreage Twenty (20) acres

Description of land irrigated:

TWP	RANGE	SEC.	NE¼				NW¼				SW¼				SE¼				TOTAL
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
13 N	74 W	28														10	10		20

The right to the beneficial use of said water hereby confirmed and established is limited to irrigation and stock purposes and said use is restricted to the place where, and to the purpose for which acquired. Appropriations are limited to the amount of water which is actually applied to beneficial use which in the case of irrigation can not exceed one cubic foot per second of time for each seventy acres of said land.

IN TESTIMONY WHEREOF I, John A. Whiting, President of the State Board of Control, have hereunto set my hand this 30th day of March, A. D. 1932, and caused the seal of said Board to be hereunto affixed.

STATE BOARD OF CONTROL

ATTEST: Grayce E. Kildred
Secretary.

By John A. Whiting
President.

2643

4646

Priority No. 2.

THE STATE OF WYOMING

Certificate of Appropriation of Water

Certificate Record No. 48, Page 184

WHEREAS, on December 27, 1912 there was entered in the District Court of the First Judicial District within and for Laramie County, State of Wyoming, a decree, and on December 5, 1928 a copy thereof was duly certified to the State Board of Control, which said decree adjudicated certain priorities of the right to the beneficial use of the waters of Big Laramie River and its tributaries, and

WHEREAS, A. H. Johnson presented evidence establishing proof of appropriation of water from Antelope Creek, tributary of Sand Creek, through Antelope No. 1 Ditch for irrigation of the lands hereinafter described in Albany County, Wyoming.

NOW KNOW YE, That the State Board of Control, under the provisions of Chapters 65 and 68, Wyoming Compiled Statutes, 1920, and amendments thereto, has, by an order duly made and entered on the 19th day of November, A. D. 19 29, in Order Record 7, Page 263, confirmed and established the priority and amount of such appropriation in accordance with said Court Decree, as follows:

Name of Appropriator A. H. Johnson; Postoffice Address Laramie, Wyoming;

Amount of Appropriation .98 cu. ft. per sec; Date of Appropriation April 1886

Total Acreage Sixty-five (65) acres

Description of land irrigated:

TWP	RANGE	SEC.	NE¼				NW¼				SW¼				SE¼				TOTAL
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
12 N	74 W	24						15	15			25	10						65

The right to the beneficial use of said water hereby confirmed and established is limited to irrigation and stock purposes and said use is restricted to the place where, and to the purpose for which acquired. Appropriations are limited to the amount of water which is actually applied to beneficial use which in the case of irrigation can not exceed one cubic foot per second of time for each seventy acres of said land.

IN TESTIMONY WHEREOF I, John A. Whiting, President of the State Board of Control, have hereunto set my hand this 30th day of March, A. D. 19 32, and caused the seal of said Board to be hereunto affixed.

STATE BOARD OF CONTROL

ATTEST: Grayce E. Eldred
Secretary.

By John A. Whiting
President.

2644

THE STATE OF WYOMING

Priority No. 3.

Certificate of Appropriation of Water

Certificate Record No. 48, Page 185

WHEREAS, on December 27, 1912 there was entered in the District Court of the First Judicial District within and for Laramie County, State of Wyoming, a decree, and on December 5, 1928 a copy thereof was duly certified to the State Board of Control, which said decree adjudicated certain priorities of the right to the beneficial use of the waters of Big Laramie River and its tributaries, and

WHEREAS, A. H. Johnson presented evidence establishing proof of appropriation of water from Antelope Creek, tributary of Sand Creek, through Antelope No. 3 Ditch for irrigation of the lands hereinafter described in Albany County, Wyoming.

NOW KNOW YE, That the State Board of Control, under the provisions of Chapters 65 and 68, Wyoming Compiled Statutes, 1920, and amendments thereto, has, by an order duly made and entered on the 19th day of November, A. D. 1929, in Order Record 7, Page 263, confirmed and established the priority and amount of such appropriation in accordance with said Court Decree, as follows:

Name of Appropriator A. H. Johnson; Postoffice Address Laramie, Wyoming;

Amount of Appropriation .45 cu. ft. per sec; Date of Appropriation June 1, 1886

Total Acreage Thirty (30) acres

Description of land irrigated:

TWP	RANGE	SEC.	NE¼				NW¼				SW¼				SE¼				TOTAL
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
12 N	74 W	24										10	20						30

The right to the beneficial use of said water hereby confirmed and established is limited to irrigation and stock purposes and said use is restricted to the place where, and to the purpose for which acquired. Appropriations are limited to the amount of water which is actually applied to beneficial use which in the case of irrigation can not exceed one cubic foot per second of time for each seventy acres of said land.

IN TESTIMONY WHEREOF I, John A. Whiting, President of the State Board of Control, have hereunto set my hand this 30th day of March, A. D. 1932, and caused the seal of said Board to be hereunto affixed.

STATE BOARD OF CONTROL

ATTEST: Grayce K. Eldred, Secretary.

By John A Whiting, President.

2645

4648

THE STATE OF WYOMING

Priority No. 4.

Certificate of Appropriation of Water

Certificate Record No. 48, Page 186

WHEREAS, on December 27, 1912 there was entered in the District Court of the First Judicial District within and for Laramie County, State of Wyoming, a decree, and on December 5, 1928 a copy thereof was duly certified to the State Board of Control, which said decree adjudicated certain priorities of the right to the beneficial use of the waters of Big Laramie River and its tributaries, and

WHEREAS, A. H. Johnson presented evidence establishing proof of appropriation of water from Antelope Creek, tributary of Sand Creek, through Garden Ditch for irrigation of the lands hereinafter described in Albany County, Wyoming.

NOW KNOW YE, That the State Board of Control, under the provisions of Chapters 65 and 68, Wyoming Compiled Statutes, 1920, and amendments thereto, has, by an order duly made and entered on the 19th day of November, A. D. 1929, in Order Record 7, Page 263, confirmed and established the priority and amount of such appropriation in accordance with said Court Decree, as follows:

Name of Appropriator A. H. Johnson; Postoffice Address Laramie, Wyoming;

Amount of Appropriation .21 cu. ft. per sec; Date of Appropriation April 1887

Total Acreage Fifteen (15) acres

Description of land irrigated:

TWP	RANGE	SEC.	NE¼				NW¼				SW¼				SE¼				TOTAL
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
13 N	74 W	28														15			15

The right to the beneficial use of said water hereby confirmed and established is limited to irrigation and stock purposes and said use is restricted to the place where, and to the purpose for which acquired. Appropriations are limited to the amount of water which is actually applied to beneficial use which in the case of irrigation can not exceed one cubic foot per second of time for each seventy acres of said land.

IN TESTIMONY WHEREOF I, John A. Whiting, President of the State Board of Control, have hereunto set my hand this 30th day of March, A. D. 1932, and caused the seal of said Board to be hereunto affixed.

STATE BOARD OF CONTROL

ATTEST: Grayce E. Eldred
Secretary.

By John A. Whiting.
President.

2646

Priority No. 1

THE STATE OF WYOMING

Certificate of Appropriation of Water

Certificate Record No. 48, Page 189

WHEREAS, on December 27, 1912 there was entered in the District Court of the First Judicial District within and for Laramie County, State of Wyoming, a decree, and on December 5, 1928 a copy thereof was duly certified to the State Board of Control, which said decree adjudicated certain priorities of the right to the beneficial use of the waters of Big Laramie River and its tributaries, and

WHEREAS, F. B. Collins presented evidence establishing proof of appropriation of water from Running Water, tributary of Sand Creek through the Collins Ditch No. 2 for irrigation of the lands hereinafter described in Albany County, Wyoming.

NOW KNOW YE, That the State Board of Control, under the provisions of Chapters 65 and 68, Wyoming Compiled Statutes, 1920, and amendments thereto, has, by an order duly made and entered on the 19th day of November, A. D. 19 29, in Order Record 7, Page 263, confirmed and established the priority and amount of such appropriation in accordance with said Court Decree, as follows:

Name of Appropriator F. B. Collins; Postoffice Address Laramie, Wyoming;

Amount of Appropriation .28 cu. ft. per sec; Date of Appropriation 1884

Total Acreage Twenty (20) acres

Description of land irrigated:

TWP	RANGE	SEC.	NE¼				NW¼				SW¼				SE¼				TOTAL
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
12 N	74 W	7						3			7								10
		6											2	8					10
																			20

The right to the beneficial use of said water hereby confirmed and established is limited to irrigation and said use is restricted to the place where, and to the purpose for which acquired. Appropriations are limited to the amount of water which is actually applied to beneficial use which in the case of irrigation can not exceed one cubic foot per second of time for each seventy acres of said land.

IN TESTIMONY WHEREOF I, John A. Whiting, President of the State Board of Control, have hereunto set my hand this 30th day of March, A. D. 19 32, and caused the seal of said Board to be hereunto affixed.

STATE BOARD OF CONTROL

ATTEST: Grayce B. Eldred
Secretary.

By John A. Whiting
President.

2647

Priority No. 2

THE STATE OF WYOMING

Certificate of Appropriation of Water

Certificate Record No. 48, Page 190

WHEREAS, on December 27, 1912 there was entered in the District Court of the First Judicial District within and for Laramie County, State of Wyoming, a decree, and on December 5, 1928 a copy thereof was duly certified to the State Board of Control, which said decree adjudicated certain priorities of the right to the beneficial use of the waters of Big Laramie River and its tributaries, and

WHEREAS, Andrew Johnson presented evidence establishing proof of appropriation of water from Running Water, tributary of Sand Creek, through Johnson No. 2 Ditch for irrigation of the lands hereinafter described in Albany County, Wyoming.

NOW KNOW YE, That the State Board of Control, under the provisions of Chapters 65 and 68, Wyoming Compiled Statutes, 1920, and amendments thereto, has, by an order duly made and entered on the 19th day of November, A. D. 19 29, in Order Record 7, Page 263, confirmed and established the priority and amount of such appropriation in accordance with said Court Decree, as follows:

Name of Appropriator Andrew Johnson; Postoffice Address Laramie, Wyoming;

Amount of Appropriation .28 cu. ft. per sec; Date of Appropriation September 1886

Total Acreage Twenty (20) acres

Description of land irrigated:

TWP	RANGE	SEC.	NE¼				NW¼				SW¼				SE¼				TOTAL
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
12 N	74 W	17												10		10			20

The right to the beneficial use of said water hereby confirmed and established is limited to irrigation and said use is restricted to the place where, and to the purpose for which acquired. Appropriations are limited to the amount of water which is actually applied to beneficial use which in the case of irrigation can not exceed one cubic foot per second of time for each seventy acres of said land.

IN TESTIMONY WHEREOF I, John A. Whiting, President of the State Board of Control, have hereunto set my hand this 30th day of March, A. D. 19 32, and caused the seal of said Board to be hereunto affixed.

STATE BOARD OF CONTROL

ATTEST: Grayce E. Eldred
Secretary.

By John A. Whiting
President.

2648

4655

THE STATE OF WYOMING

Priotiby No. 2

Certificate of Appropriation of Water

Certificate Record No. 48, Page 191

WHEREAS, on December 27, 1912 there was entered in the District Court of the First Judicial District within and for Laramie County, State of Wyoming, a decree, and on December 5, 1928 a copy thereof was duly certified to the State Board of Control, which said decree adjudicated certain priorities of the right to the beneficial use of the waters of Big Laramie River and its tributaries, and

WHEREAS, Andrew Johnson presented evidence establishing proof of appropriation of water from Running Water, tributary of Sand Creek through Johnson Ditch for irrigation of the lands hereinafter described in Albany County, Wyoming.

NOW KNOW YE, That the State Board of Control, under the provisions of Chapters 65 and 68, Wyoming Compiled Statutes, 1920, and amendments thereto, has, by an order duly made and entered on the 19th day of November, A. D. 19 29, in Order Record 7, Page 263, confirmed and established the priority and amount of such appropriation in accordance with said Court Decree, as follows:

Name of Appropriator Andrew Johnson; Postoffice Address Laramie, Wyoming;

Amount of Appropriation .43 cu. ft. per sec; Date of Appropriation September 1886

Total Acreage Thirty (30) acres

Description of land irrigated:

TWP	RANGE	SEC.	NE¼				NW¼				SW¼				SE¼				TOTAL
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
12 N	74W	20	20 a. Lot 2																20
		17															10		10
																			30

The right to the beneficial use of said water hereby confirmed and established is limited to irrigation and said use is restricted to the place where, and to the purpose for which acquired. Appropriations are limited to the amount of water which is actually applied to beneficial use which in the case of irrigation can not exceed one cubic foot per second of time for each seventy acres of said land.

IN TESTIMONY WHEREOF I, John A. Whiting, President of the State Board of Control, have hereunto set my hand this 30th day of March, A. D. 19 32, and caused the seal of said Board to be hereunto affixed.

STATE BOARD OF CONTROL

ATTEST: Grayce E. Eldred
Secretary.

By John A. Whiting
President.

2649

THE STATE OF WYOMING

Priority No. 1

Certificate of Appropriation of Water

Certificate Record No. 48, Page 204

WHEREAS, on December 27, 1912 there was entered in the District Court of the First Judicial District within and for Laramie County, State of Wyoming, a decree, and on December 5, 1928 a copy thereof was duly certified to the State Board of Control, which said decree adjudicated certain priorities of the right to the beneficial use of the waters of Big Laramie River and its tributaries, and

WHEREAS, Jackson I. Brown presented evidence establishing proof of appropriation of water from Shell Creek, tributary of through Shell Creek Water Ditch for irrigation of the lands hereinafter described in Albany County, Wyoming.

NOW KNOW YE, That the State Board of Control, under the provisions of Chapters 65 and 68, Wyoming Compiled Statutes, 1920, and amendments thereto, has, by an order duly made and entered on the 19th day of November, A. D. 1929, in Order Record 7, Page 264, confirmed and established the priority and amount of such appropriation in accordance with said Court Decree, as follows:

Name of Appropriator Jackson I. Brown; Postoffice Address French, Wyoming;

Amount of Appropriation 2.43 cu. ft. per sec; Date of Appropriation Feb. 1877

Total Acreage One Hundred Seventy (170) acres

Description of land irrigated:

TWP	RANGE	SEC.	NE¼				NW¼				SW¼				SE¼				TOTAL
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
13 N	75 W	27					40	40	40	40		10							170

The right to the beneficial use of said water hereby confirmed and established is limited to irrigation and said use is restricted to the place where, and to the purpose for which acquired. Appropriations are limited to the amount of water which is actually applied to beneficial use which in the case of irrigation can not exceed one cubic foot per second of time for each seventy acres of said land.

IN TESTIMONY WHEREOF I, John A. Whiting, President of the State Board of Control, have hereunto set my hand this 30th day of March, A. D. 1932, and caused the seal of said Board to be hereunto affixed.

STATE BOARD OF CONTROL

ATTEST: Grayce E. Eldred
Secretary.

By John A. Whiting
President.

2650

4682

THE STATE OF WYOMING

Priority No. 2

Certificate of Appropriation of Water

Certificate Record No. 48, Page 205

WHEREAS, on December 27, 1912 there was entered in the District Court of the First Judicial District within and for Laramie County, State of Wyoming, a decree, and on December 5, 1928 a copy thereof was duly certified to the State Board of Control, which said decree adjudicated certain priorities of the right to the beneficial use of the waters of Big Laramie River and its tributaries, and

WHEREAS, Josiah D. Payne, Jr. presented evidence establishing proof of appropriation of water from Shell Creek, tributary of Through Farr Ditch for irrigation of the lands hereinafter described in Albany County, Wyoming.

NOW KNOW YE, That the State Board of Control, under the provisions of Chapters 65 and 68, Wyoming Compiled Statutes, 1920, and amendments thereto, has, by an order duly made and entered on the 19th day of November, A. D. 19 29, in Order Record 7, Page 264, confirmed and established the priority and amount of such appropriation in accordance with said Court Decree, as follows:

Name of Appropriator Josiah D. Payne, Jr.; Postoffice Address Laramie, Wyoming;

Amount of Appropriation 4.14 cu. ft. per sec; Date of Appropriation Spring 1883

Total Acreage Two Hundred Ninety (290) acres

Description of land irrigated:

TWP	RANGE	SEC.	NE¼				NW¼				SW¼				SE¼				TOTAL
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
12 N	75 W	18		25			40		30	40									135
		7												15	40	40	40	20	155
																			290

The right to the beneficial use of said water hereby confirmed and established is limited to irrigation and stock purposes and said use is restricted to the place where, and to the purpose for which acquired. Appropriations are limited to the amount of water which is actually applied to beneficial use which in the case of irrigation can not exceed one cubic foot per second of time for each seventy acres of said land.

IN TESTIMONY WHEREOF I, John A. Whiting, President of the State Board of Control, have hereunto set my hand this 30th day of March, A. D. 19 32, and caused the seal of said Board to be hereunto affixed.

STATE BOARD OF CONTROL

ATTEST: Grayce E. Eldred
Secretary.

By John A. Whiting
President.

2651

4683

Priority No. 3

THE STATE OF WYOMING

Certificate of Appropriation of Water

Certificate Record No. 48, Page 206

WHEREAS, on December 27, 1912 there was entered in the District Court of the First Judicial District within and for Laramie County, State of Wyoming, a decree, and on December 5, 1928 a copy thereof was duly certified to the State Board of Control, which said decree adjudicated certain priorities of the right to the beneficial use of the waters of Big Laramie River and its tributaries, and

WHEREAS, Josiah D. Payne, Jr. presented evidence establishing proof of appropriation of water from Shell Creek, tributary of through Payne Ditch for irrigation of the lands hereinafter described in Albany County, Wyoming.

NOW KNOW YE, That the State Board of Control, under the provisions of Chapters 65 and 68, Wyoming Compiled Statutes, 1920, and amendments thereto, has, by an order duly made and entered on the 19th day of November, A. D. 19 29, in Order Record 7, Page 264, confirmed and established the priority and amount of such appropriation in accordance with said Court Decree, as follows:

Name of Appropriator Josiah D. Payne, Jr.; Postoffice Address Laramie, Wyoming;

Amount of Appropriation .21 cu. ft. per sec; Date of Appropriation Spring 1885

Total Acreage Fifteen (15) acres

Description of land irrigated:

TWP	RANGE	SEC.	NE¼				NW¼				SW¼				SE¼				TOTAL
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
12 N	75 W	18		15															15

The right to the beneficial use of said water hereby confirmed and established is limited to irrigation and said use is restricted to the place where, and to the purpose for which acquired. Appropriations are limited to the amount of water which is actually applied to beneficial use which in the case of irrigation can not exceed one cubic foot per second of time for each seventy acres of said land.

IN TESTIMONY WHEREOF I, John A. Whiting, President of the State Board of Control, have hereunto set my hand this 30th day of March, A. D. 19 32, and caused the seal of said Board to be hereunto affixed.

STATE BOARD OF CONTROL

ATTEST: Grayce E. Eldred
Secretary.

By John A. Whiting
President.

2652

COMPLAINANT'S EXHIBIT 86

Aug 27, 1931

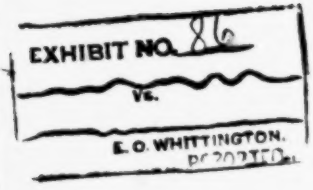
Diversion Dist #4 into Dist #3.

Credit in Dist #3

Laramie Poudre Tunnel 1641 sec ft for 24 hours

Lost Lake 50.7 sec ft for 24 hr

W J McAuley
Water Commissioner
Dist #3



To STATE ENGINEER,
Capitol Building, Denver, Colo.

No. 15

The following is the record of the diversion of water from District No. 48, into District No. 3, for the week ending Saturday, August 24, 1931.

No. of Days Diversion	Average Daily Amount of Water Diverted [Second-Feet]	Source of Supply in District No. 48	Name of Diverting Ditch in District No. 48
4	5.0	Laramie	Laramie Poudre Tunnel
7	14.5	"	Sky Line

Name of Ditch or Reservoir in District No. 3 Receiving the Above	No. of Days Water Distributed	Average Daily Amount of Water Distributed [Second-Feet]	REMARKS
Larimer County	7	16.5	EXHIBIT NO. 87 vs. E. O. WHITTINGTON, REPORTER.

RECEIVED SEP 1931 STATE ENGINEER COLO.

Reported by King Gifford

(Signed) [signature] Water Com'r Dist. No. 3
Fort Collins, Colo.

Date August 30 1931

DIRECTIONS—Use one or more blanks for each district. Average daily amount of water will be found by adding the average flow for each day and dividing by the number of days diversion.
Mail report to State Engineer and retain carbon for your office record.

2654

1212

COMPLAINANT'S EXHIBIT 88

COMPLAINANT'S EXHIBIT 89

STATE OF COLORADO
ENGINEERING DEPARTMENT
CURRENT METER NOTES

DATE 7-5 1932 TIME { BEGIN ..... END .....

DIV. 1 DIST. 3

Laramie - Poudre Tun. RIVER, AT Outlet Venturi Flume

GAGE HT. BEGINNING 1.13 FT. ENDING 1.17 FT. MEAN 1.15 FT. METER NO. .....

MEAS. Hinderlider NOTES BY R. L. Parshall - Jno E. Field

Dist. from initial point	Depth	Depth of observat.	Revolutions	Time in seconds	VELOCITY At point	VELOCITY Mean in vertical	VELOCITY Mean in section	Area	Mean Depth	Width	Discharge
		.6									
0	1.37		80	42.8	4.23						5.3
1	1.33		80	39.2	4.60		4.41	1.35	1.35	1	5.95 ✓
2	1.32		80	31.8	5.67		5.54	1.32	1.32	1	6.78 ✓
3	1.30		80	32.4	5.67		5.67	1.31	1.31	1	7.43 ✓
4	1.31		80	45.2	4.05		4.86	1.31	1.31	1	6.37 ✓
5	1.37		80	54.6	3.30		3.67	1.34	1.34	1	4.92 ✓
6	1.35		80	95.0	1.97		2.63	1.36	1.36	1	3.57 ✓
7	1.30		20	85.0	0.58		1.29	1.32	1.32	1	1.70
7.7	1.34		20	91.7	0.54		0.56	0.92	1.32	.7	0.52
	Computed from Fields Meter Table →										37.24
	Total as computed later by Burgess										
	using proper meter table ~~Table~~ =										
						↓					
0	1.37	.6	80	42.8		4.24					✓
1	1.33		80	37.2		4.55	4.40	1.35		1	5.94
2	1.32		80	31.8		5.61	5.08	1.32		1	6.70
3	1.30		80	32.4		5.51	5.56	1.31		1	7.28
4	1.31		80	45.2		3.95	4.73	1.30		1	6.15
5	1.37		80	54.0		3.26	3.60	1.34		1	4.82
6	1.35		80	95.0		1.90	2.58	1.36		1	3.51
7	1.30		20	85		0.56	1.23	1.32		1	1.62
7.7	1.34		20	91.7		0.52	0.54	0.92	1.32	0.7	0.50
											36.52

Meas. made about 4' upstream from thrust section

Totals Cross currents due to gravel deposits above

PLACE NOTES ON BACK OF SHEET

2656

CLERK'S COPY.

Vol. III

TRANSCRIPT OF RECORD

Supreme Court of the United States

OCTOBER TERM, 1935

No. 10, Original

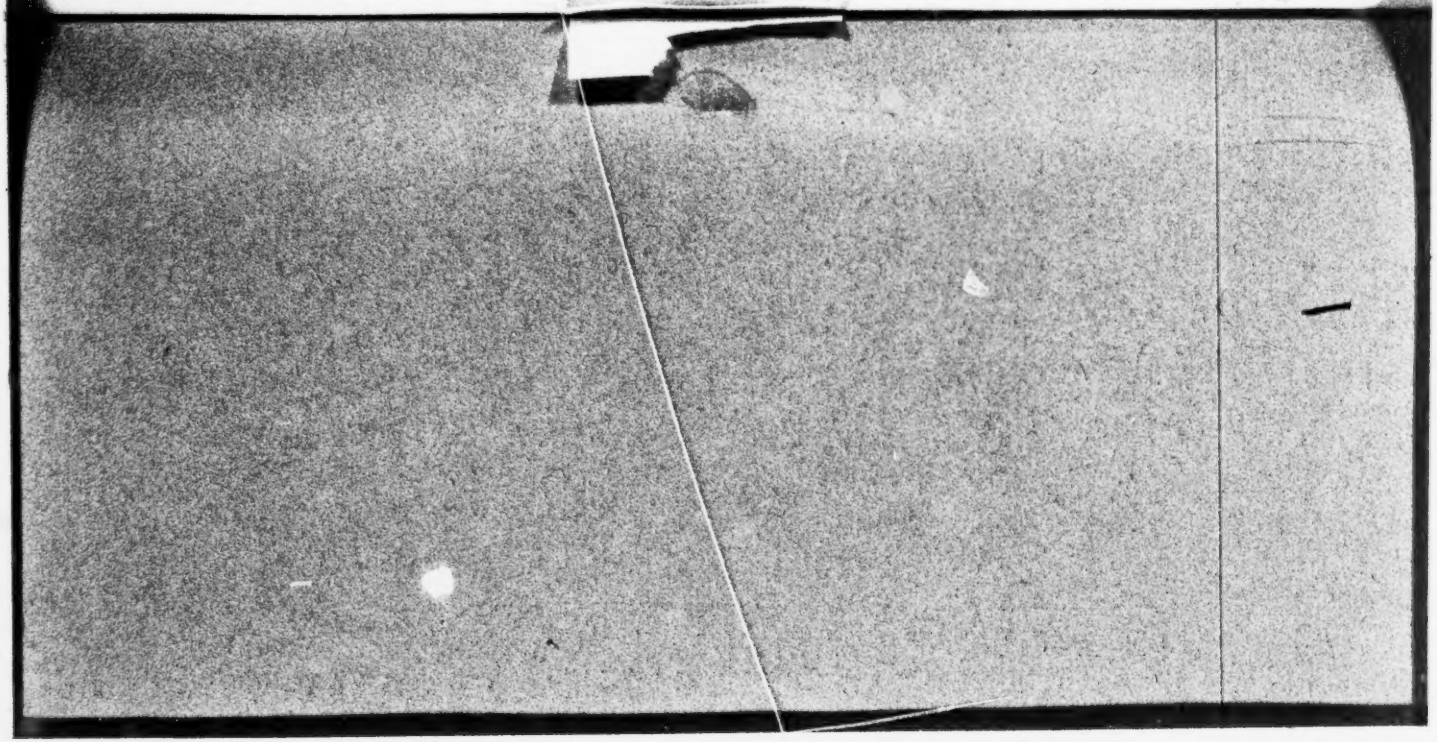
THE STATE OF WYOMING, COMPLAINANT,

vs.

THE STATE OF COLORADO.

IN EQUITY.

FILED OCTOBER 13, 1930.



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VOL. III.

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JUDD & DETWEILER (INC.), PRINTERS, WASHINGTON, D. C., AUGUST 28, 1935.

—6826-C

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[fol. 2657] COMPLAINANT'S EXHIBIT No. 90

State of Colorado,

Engineering Department,

Denver

M. C. Hinderlider, State Engineer; C. C. Hezmalhalch, Deputy; J. Harold Baily, Chief Hydrographer

October 5th, 1928.

Miss Agnes Zimmerman, Home, Colorado.

Subject: Greeley-Poudre Tunnel

DEAR MISS ZIMMERMAN:

Your letter of September 30th, addressed to Mr. Baily, requesting information on the Venturi Flume at the outlet of Greeley-Poudre Tunnel, has been referred to the writer for reply.

The flume in question was not installed by the writer, but was constructed under the supervision of Mr. Parshall of the Department of Irrigation Investigations. It is a 6 ft. timber structure placed within the section of the lower end of the concrete flume below the outlet of the tunnel.

Soon after installation, this flume was carefully checked and rated by Mr. Parshall and his assistant Mr. Rohwer, at which time a new gage was installed for checking the automatic register. Mr. Parshall immediately advised me of the results of his measurements, which seemed to check quite closely with the standard Venturi tables, copy of which you doubtless have. Based upon this information, the Water Commissioner was directed to use such tables in determining the amount of water discharged by the Tunnel.

There appears to be considerable variance between Mr. Baily's measurement of September 26th, when he found 11.86 sec. ft., and the standard rating tables. This discharge is for a gage height of 0.57. As a result of this measurement by Mr. Baily, I immediately called up Mr. Rohwer, assistant to Mr. Parshall, and asked him to make further investigations, which he did on the 5th inst., and reports the following:

[fol. 2658] For a gage height of 0.575, a discharge of 9.85 sec. ft. For this same gage height, the Venturi flume tables give a discharge of 9.93 sec. ft., which is practically a check.

We questioned Mr. Baily on the accuracy of his work, and he is unable to understand the reason for the discrepancy between his measurement and the result of Mr. Rohwer's. Due to the fact that Mr. Rohwer was instructed by me to use particular care, and had an engineer's level for checking the soundings and gage readings, I would be inclined to accept his results.

Very truly yours, M. C. Hinderlider, State Engineer.

MCH/bc.

(Here follows 5 photos, side folios 2659-2663.)

1206A

STATE OF COLORADO
ENGINEERING DEPARTMENT
CURRENT METER NOTES

DATE Sept 26 to 28 TIME BEGIN ..... END .....

DIV ..... DIST .....

Greeley Poudre Riv. RIVER AT Venturi flume

GAGE HT. BEGINNING 0.57 FT. ENDING 2.56 FT MEAN ..... FT. METER NO .....

MEAS Bailey NOTES BY Bailey

Dist. from initial point	Depth	Depth of observat.	Revolutions	Time in seconds	VELOCITY: At point	VELOCITY: Mean in vertical	VELOCITY: Mean in section	Area	Mean Depth	Width	Discharge
0	0.68		10	48	Backwater						
1	0.68		10	48		.47					
2	.70		20	36½		1.20	.84	.69			.58
3	.66		40	40		2.18	1.69	.68			1.15
4	.70		40	37½		2.32	2.23	.68			1.53
5	.70		50	40½		2.68	2.50	.70			1.75
6	.72		50	35		3.11	2.90	.71			2.06
7	.70		50	34½		3.16	3.19	.71			2.23
8	.70		50	36		3.02	3.04	.83			2.52
											11.84

Chart read 0.62
Not changed

Totals

PLACE NOTES ON BACK OF SHEET

2659

COMPLAINANT'S EXHIBIT 91

Meas. by Widman

STATE OF WYOMING
BOARD OF CONTROL

Gage at Beginning .95
Gage at end

DISCHARGE MEASUREMENT NOTES

Date June 1931

Mean
Discharge S. F.

[illegible] River, Canal at R.R.

Dist. from initial point	Depth	Depth of observation	Revolutions	Time in seconds	VELOCITY At point	VELOCITY Mean in vertical	VELOCITY Mean in section	Area	Mean depth	Width	Discharge
4	.8		0	0							
5	.9		15	58	.70		.35		.85	1	.30
6	.9		30	[illegible]	1.20		.95		.9	1	.86
7	.9		30	[illegible]	1.66		1.40		.9	1	1.26
8	.9[illegible]		50	[illegible]	1.92		1.76		.93	1	1.64
9	.95		50	8[illegible]	2.32		2.12		.95	1	2.01
10	.9		50	8[illegible]	2.32		2.32		.93	1	2.16
11	.8		50	5[illegible]	2.14		2.23		.85	1	1.90
12	.7		50	5[illegible]	2.14		2.14		.75		1.61
13	.7		50	5[illegible]	2.02		2.08		.7	1	1.46
14	.7		50	5.1	2.02		2.02		.7	1	1.41
15	.7		30	[illegible]	1.44		1.73		.7	1	1.21
16	.7		30	8[illegible]	1.41		1.43		.7	1	1.00
17	.7		30	[illegible]	1.33		1.40		.7	1	.98
18	.8		30	[illegible]	[illegible]		1.29		.75		.97
19	.9		30	[illegible]	1.16		1.18		.85	1	1.00
19.3	.9		0	0			.58	.27	.9	.3	.16
											19.83
											19.93

[illegible] Check

[illegible]

Totals.

No. ____ of ____ Sheets. Comp. by [illegible] Chk. by [illegible]

2660

12060

COMPLAINANT'S EXHIBIT 92

G. H. 20

9-275
May, 1916

DEPARTMENT OF THE INTERIOR
~~UNITED STATES GEOLOGICAL SURVEY~~
WATER RESOURCES BRANCH

File No.
Washington
Field
No. of Meas.

Date July 17, 1929 5.30 Pm.

DISCHARGE MEASUREMENT NOTES

Outlet Laramie Tunnel River, at Venturi

Dist. from initial point	Depth	Depth of observation	Revolutions	Time in seconds	VELOCITY At point	VELOCITY Mean in vertical	VELOCITY Mean in section	Area	Mean depth	Width	Discharge
0	2.5	.6	80	44	3.98						
							4.23	5.0	2.5	2	21.15
2	2.5		90	44	4.48						
							4.64	5.0	2.5	2	23.20
4	2.5		90	41	4.80						
							4.69	5.0	2.5	2	23.45
6	2.5		90	43	4.58						
							4.64	5.0	2.5	2	23.20
8	2.5		90	42	4.69						91.00

Was ordered off
Cars takes "Loose"

Totals

No. ____ of ____ Sheets. Comp. by G.D. Chk. by ✓

U. S. GOVERNMENT PRINTING OFFICE 1926 6—7688

COMPLAINANT'S EXHIBIT 93

12060

Out of Sand Creek — Colorado

STATE OF WYOMING

Meas. by Drummond

STATE ENGINEER'S OFFICE
CHEYENNE, WYO.

Pm 2.45
Am 3.15

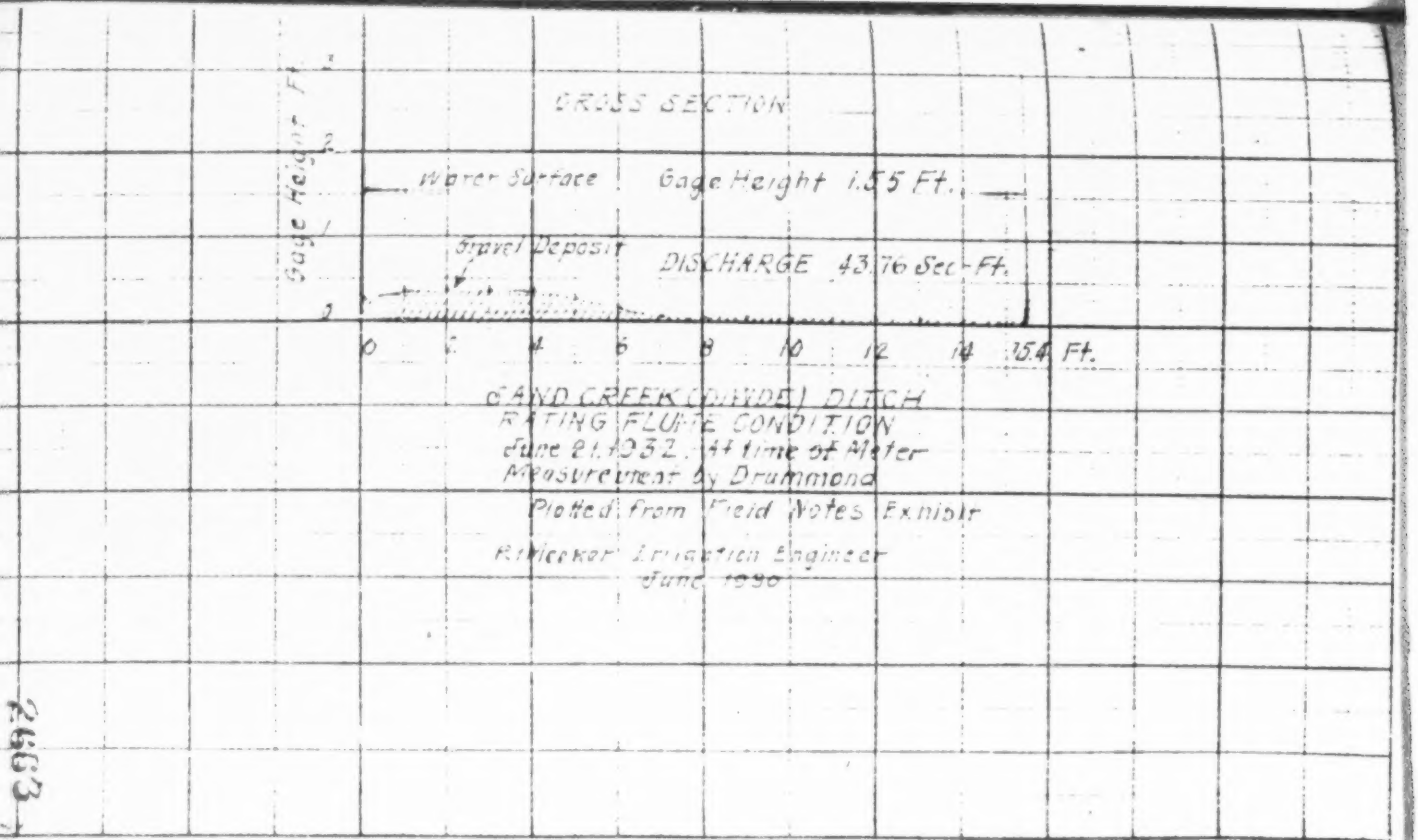
Gage at Beginning 1.55
Gage at End 1.55
Mean
Discharge S.F.

Date 6-24 1932 DISCHARGE MEASUREMENT NOTES

Stream Divide A at Ratina Flume

Dist. from initial point	Depth	Depth of observation	Revolutions	Time in seconds	VELOCITY: At Point	VELOCITY: Mean in vertical	VELOCITY: Mean in section	Area	Mean Depth	Width	Discharge
0	.43		15	47		.72					
1	1-2		20	40		1.10	.91	1.25	1.25	1	1.14
2	1-2		30	40		1.64	1.37	1.2	1.2	1	1.24
3	1-2		50	46½		2.40	2.02	1.2	1.2	1	2.42
4	1-2		50	42		2.59	2.5	1.2	1.2	1	3.00
5	1-3		60	44		2.97	2.78	1.3	1.3	1	3.61
6	1-4		50	40		2.72	2.85	1.4	1.4	1	3.99
7	1-5		60	48		2.72	2.72	1.5	1.5	1	4.08
8	1-5		50	42		2.59	2.66	1.5	1.5	1	3.99
9	1-5		50	41.5		2.42	2.45	1.5	1.5	1	3.68
10	1-5		50	48		2.27	2.35	1.5	1.5	1	3.53
11	1-5		40	45		1.95	2.11	1.5	1.5	1	3.17
12	1-5		40	45½		1.93	1.94	1.5	1.5	1	2.91
13	1-5		30	41		1.60	1.77	1.5	1.5	1	2.66
14	1-5		30	61		1.09	1.34	1.5	1.5	1	2.01
15 1/10	1-5		15	45		.75	.92	2.1	1.5	1.4	1.93
											43.76

Sheets Comp. by. G D Chk. by. E B D.



2663

EUGENE DIETZGEN CO., CHICAGO-NEW YORK NO. 340 C

[fol. 2664]

COMP. EXH. #95

Sand Creek (Divide) Ditch

Check Current Meter Measurements

At Conrete Flume 15.5 Feet Wide 16 Feet Long Compared With Rating Table Used From 1922–1933
R. I. Meeker, Irrigation Engineer June 27th, 1933

(Current Meter Measurements used as base records)

Date	Gage height feet	Measured discharge sec. ft.	1922 rating table sec. ft.	Difference		Hydrographer	Testimony of
				Sec. ft.	Per cent		
1929							
July 12	0.69	8.60	10.30	+ 1.70	+19.8	R. I. Meeker	Meeker—Wyoming, page 491
July 12	0.69	8.56	10.30	+ 1.74	+20.4	Goyne Drummond	
1931							
June 14	0.95	19.93	16.50	− 3.43	−17.3	George Widman	Widman—Complainants Exhibit 91
1932							
June 21	1.55	43.76	40.45	− 3.31	− 7.6	Goyne Drummond	Drummond—Wyoming, page 220
1933							
June 5	2.60	96.00	95.00	− 1.00	− 0.1	L. L. Stimpson	Stimpson—Colorado, page 1772
June 5	3.40	167.00	(a) 147.50	−19.50	−11.7	L. L. Stimpson	Stimpson—Colorado, page 1772
June 11	3.08	137.62	(a) 123.50	−14.12	−10.4	McGraw	Potts—Colorado, page 1712
June 11	2.96	127.18	115.30	−11.88	− 9.1	Potts	Potts—Colorado, page 1712.
—After cleaning of Flume—See Testimony of Stimpson, Colorado Transcript Page 1813.							
June 13	1.60	43.00	43.00	.....	.....	L. L. Stimpson	Stimpson, Defendant's Exhibit H-2
June 13	0.83	13.22	13.25	+ 0.03	+ 0.2	L. L. Stimpson	Stimpson, Defendant's Exhibit H-2
June 13	3.10	136.00	(a) 125.00	−11.00	− 8.1	L. L. Stimpson	Stimpson, Defendant's Exhibit H-2
June 13	3.25	151.79	(a) 136.25	−15.54	−10.2	L. L. Stimpson	Stimpson, Defendant's Exhibit H-2
June 13	2.77	109.57	104.85	− 4.72	− 4.3	L. L. Stimpson	Stimpson, Defendant's Exhibit H-2
June 13	2.48	89.10	88.40	− 0.70	− 0.8	L. L. Stimpson	Stimpson, Defendant's Exhibit H-2

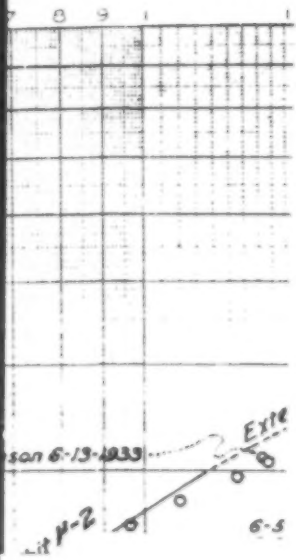
Note: (a) Extension of 1922 Rating Table of McAnelly by Meeker on Logarithmic cross section paper.

COMP. EXH. #95—Continued

1922 Rating Table of Sand Creek (Divide) Ditch

G H	Sec. ft.	G H	Sec. ft.	
0.4	5.0	1.9	58.0	Copied from McAnelly's Records at Ft. Collins, Colorado April 26th, 1929; also, See Defendant's Exhibit H-2. Stimpson Testimony.
0.5	6.7	2.0	63.0	
0.6	8.5	2.1	68.0	
0.7	10.5	2.2	73.0	
0.8	12.5	2.3	78.5	
0.9	15.0	2.4	84.0	
1.0	18.0	2.5	89.5	
1.1	21.0	2.6	95.0	
1.2	24.5	2.7	101.0	
1.3	28.5	2.8	106.5	
1.4	33.0	2.9	112.0	
1.5	37.9	3.0	117.5	
1.6	43.0	(3.1)	(125.0)	Ext. by Meeker on Log Paper.
1.7	48.0	(3.2)	(132.5)	Ext. by Meeker on Log Paper.
1.8	53.0	(3.3)	(140.0)	Ext. by Meeker on Log Paper.
		(3.4)	(147.5)	Ext. by Meeker on Log Paper.

(Here follows photolithograph of Complainant's Exhibit 96, side folio 2605.)



FOLD-OUT IS TOO LARGE TO BE FILMED

[fol. 2666] COMP. EXH. No. 97

MEMORANDUM CONCERNING CURRENT METER GAGINGS MADE ON THE 6-FOOT PARSHALL MEASURING FLUME AT EAST PORTAL OF LARAMIE-POUDRE WATERSHED

This structure was built early in the spring of 1927 for the purpose of measuring the water diverted from the Laramie River through this tunnel in the Poudre watershed. The ordinary rectangular rating flume formerly used was found to be impractical because of the debris from the tunnel lodging on the floor of the flume. This trouble still persists.

Appended is a tabulation showing the results of eight current meter ratings made on this 6-foot Parshall measuring flume at the tunnel during the period 1927-1932. It will be noted that the percentage of deviation is considerable for some of the measurements because of deposits of rocks and boulders in the approach section of the flume, as indicated by the accompanying photograph which was made July 5, 1932, showing the current all to one side and a rock barrier which interferes with the flow. The gaging made July 5, 1932, with a measured discharge of 37.06 second feet was for the identical condition as shown in the picture, the gaging section being just upstream from the H_a gage. This measurement shows a wide variation in the velocity across the section. Whereas, with the gaging made July 10, 1932, for the same condition, the section chosen was about 3 feet upstream from the crest, this giving a somewhat better distribution of velocities.

In my opinion it is asking too much of this type of measuring device to measure within practical limits under conditions imposed here because of the debris and unbalanced velocity conditions.

R. L. Parshall.

Comparative Table

Laramie-Poudre 6 Ft. Improved Venturi Flume (Parshall Flume)

Current Meter Measurements vs. Venturi Discharge Tables

Prepared by R. I. Meeker, Irrigation Engineer from Testimony Submitted in Wyoming vs. Colorado, June 27th, 1933

(Current Meter Measurements Taken as Base Records)

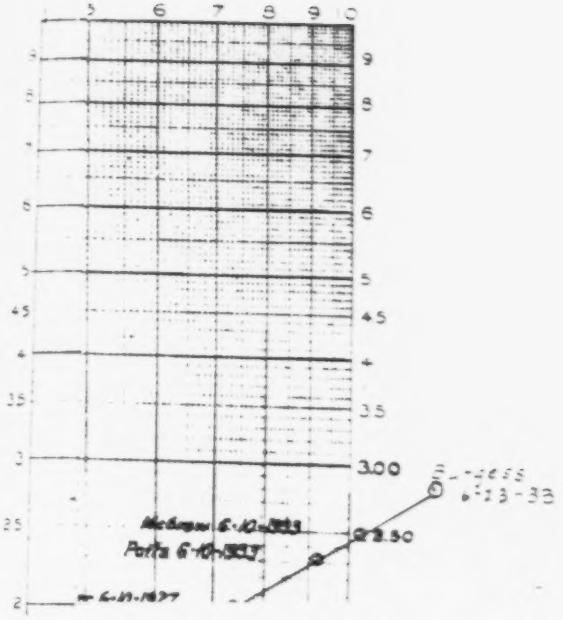
Date	Gage height feet	Metered discharge sec. ft.	Venturi discharge table sec. ft.	Difference		Hydrographer	Source
				Second-ft.	Per cent		
1927							
May 24	0.92	20.51	21.01	+0.50	+ 2.4	M. C. Hinderlider	Defendant's Exhibits E-1, T-1
May 24	0.92	20.98	21.01	+0.03	0.0	M. C. Hinderlider	Defendant's Exhibits E-1, T-1
May 24	0.50	8.33	7.94	−0.39	− 4.9	M. C. Hinderlider	Defendant's Exhibits E-1, T-1
June 10	2.02	73.40	73.66	+0.26	+ 0.4	Rowher	Defendant's Exhibits E-1, T-1
June 16	1.04	25.30	25.55	+0.25	+ 1.0	Rowher	Defendant's Exhibits E-1, T-1
July 17	0.57	10.47	9.79	−0.68	− 6.5	Parshall	Defendant's Exhibits E-1, T-1
1928							
Sept. 26	0.56	11.86	9.52	−2.34	−24.6	Baily	Complainant's Exhibit 90
Oct. 3	0.58	9.85	10.07	+0.22	+ 2.2	Rowher	Defendant's Exhibits E-1, T-1
1929							
July 11	±0.70	(a)15.35	13.59	−1.76	(a)−11.5	R. I. Meeker	Defendant's Exhibits E-1, T-1
July 11	±0.70	(a)15.19	13.59	−1.60	(a)−10.4	Goyne Drummond	Complainant's Exhibit 60
July 17	2.00	91.00	72.50	−18.50	−20.3	Goyne Drummond	Complainant's Exhibit 60
July 18	0.84	22.77	18.17	−4.60	−25.3	Baily	Defendant's Exhibits E-1, F-1, T-1
July 18	0.74	15.36	14.85	−0.51	− 3.3	Baily	Defendant's Exhibits E-1, G-1, T-1
Aug. 3	0.54	9.65	8.98	−0.67	− 7.0	Baily	Defendant's Exhibits E-1, T-1
1930							
May 20	*0.65	13.76	12.08	−1.08	− 7.8	Baily	Complainant's Exhibit 60
June 8	0.79	15.25	16.48	+1.23	+ 8.1	Parshall	Defendant's Exhibits E-1, T-1
June 8	0.87	19.07	19.22	+0.15	+ 0.8	Parshall	Defendant's Exhibits E-1, T-1
July 4	0.60	11.51	10.63	−0.88	− 7.6	Baily	Defendant's Exhibits E-1, T-1
Aug. 5	0.45	7.28	6.72	−0.56	− 7.7	Baily	Defendant's Exhibits E-1, T-1
1931	No measurements.						

COMP. EXH. No. 98—Continued

Date	Gage height feet	Metered discharge sec. ft.	Venturi discharge table sec. ft.	Difference Second-ft.	Difference Per cent	Hydrographer	Source
1932							
June 18	1.86	64.82	64.57	−0.25	− 0.4	C. E. McGraw	Defendant's Exhibits E-1, T-1
July 5	1.11	(b)34.68	28.35	−6.33	(b)−18.2	M. C. Hinderlider, R. L. Parshall,	
July 5	1.15	(b)36.52	30.00	−6.52	(b)−17.8	J. E. Field, M. C. Hinderlider, R. L. Parshall, J. E. Field	Defendant's Exhibits E-1, T-1
July 5	1.18	(b)37.06	31.25	−5.81	(b)−15.7	Parshall	Complainant's Exhibit 89
July 10	1.18	33.41	31.25	−2.16	− 6.4	Parshall.	Defendant's Exhibits E-1, T-1
July 15	*1.54	54.59	47.79	−6.80	−12.5	Whitten	Defendant's Exhibits E-1, T-1
Aug. 15	1.19	30.04	31.68	+1.64	+ 5.4	L. T. Burgess	Complainant's Exhibit 60
Sept. 5	0.90	19.52	20.29	+0.77	+ 3.9	Whitten	Defendant's Exhibits E-1, T-1
Sept. 22	0.64	11.76	11.78	+0.02	+ 0.2	Whitten	Defendant's Exhibits E-1, T-1
1933							
April 16	0.32	3.83	3.90	+0.07	+ 1.8	R. I. Meeker	Defendant's Exhibits E-1, T-1
June 10	2.326	91.95	92.25	+0.30	+ 0.3	Potts	Complainant's Testimony, page 561
June 10	2.497	100.70	103.29	+2.59	+ 2.6	McGraw	Defendant's Exhibit V-1
June 23	2.83	124.32	126.26	+1.94	+ 1.6	L. T. Burgess	Defendant's Exhibit W-1
							Defendant's Exhibit K-3

* Chart Gage Height used: Staff gage height not entered in Meter notes.
(a) For rock debris conditions at Venturi Flume, see Complainant's Exhibit 57.
(b) For rock debris conditions at Venturi Flume, see Complainant's Exhibit 88.

(Here follow photolithographs of Complainant's Exhibits 99, 100, 101 and 102, side folios 2668-2671, inclusive.)



MAP IS TOO LARGE TO BE FILMED

COMPLAINANT'S EXHIBIT 100
EAST PORTAL LARAMIE - POUDRE TUNNEL

FLOW CONDITIONS AT IMPROVED VENTURI FLUME

Diversion Quantities approximately 80 to 70 Second-feet.

R. I. Meeker June 24, 1933.

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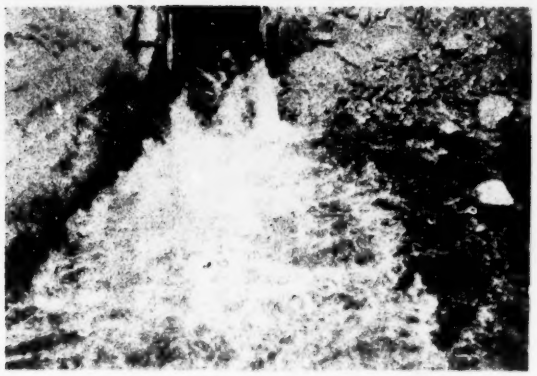

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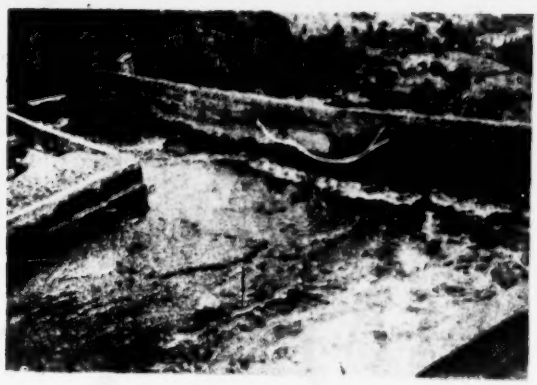

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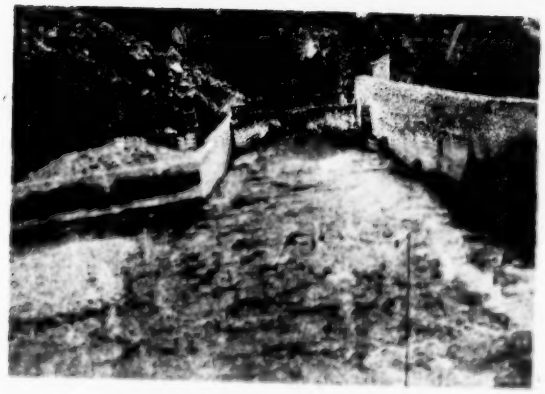

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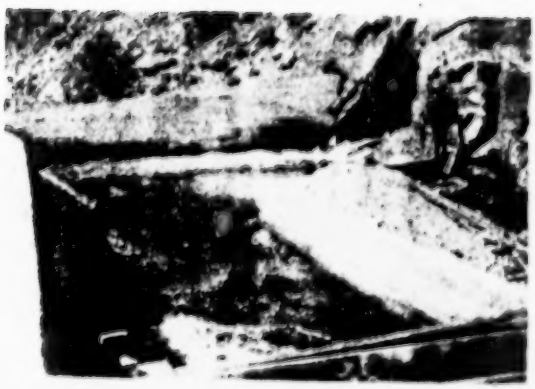

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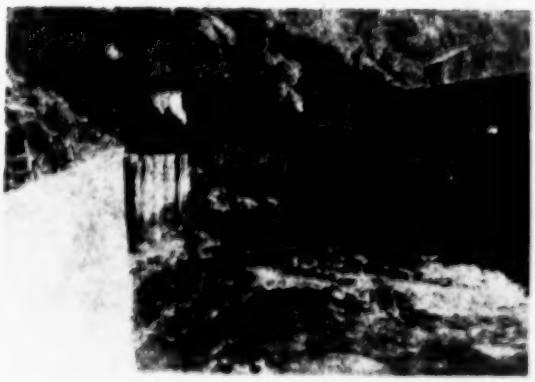

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2669

COMPLAINANT'S EXHIBIT 101

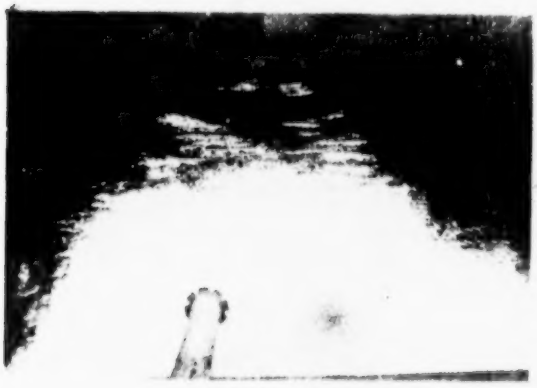
WEST PORTAL LARAMIE - POUDRE TUNNEL

FLOW CONDITIONS IN INLET CANAL

Diversion Quantities approximately 70 Second-feet.

R. I. Meeker June 24, 1933

.....



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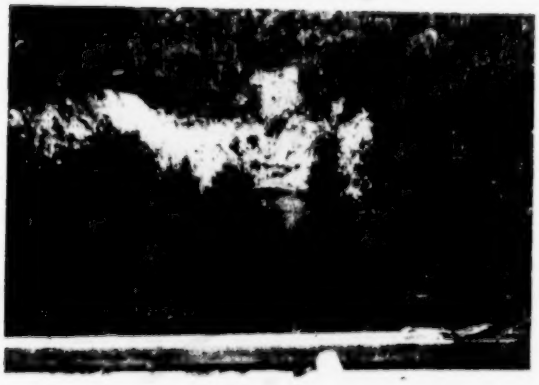

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2670

3

COMPLAINANT'S EXHIBIT 102

#1

#2

#3

#4

2671

[fol. 2672] COMP. EXH. No. 103

Home, Colo.,
Sunday, April 9, 1933.

Visited eastern end of Larimie Poudre Tunnel at 10:30 A. M. today. Found .45 ft. of water running thru Venturi flume (6 ft. Parshall Venturi). Gauge well was dry and gauge not running. Chart on automatic gauge undated and had been used some. Gauge of Bristol make. Ice covered ¾ of flume but above water, that is suspended by being frozen to right side of flume.

(Signed) Ben F. Powell. Witness: Agnes Zimmerman.

Def Ex #1

DEFENDANT'S EXHIBIT A

Annual diversions from Laramie River basin, 1899–1921, in acre-feet.

Year.	Skyline ditch.	Sand Creek system.	Laramie-Poudre tunnel.	Total diverted from Laramie River.
1899	17,700			17,700
1900	18,700			18,700
1901	23,800			23,800
1902	22,100	1,920		24,000
1903	26,100	1,710		27,800
1904	23,400	6,810		30,200
1905	13,300	0		13,300
1906	16,700	5,000		21,700
1907	15,000	5,400		20,400
1908	18,000	2,090		20,100
1909	12,700	0		12,700
1910	16,400	783		17,200
1911	19,100	4,420		23,580
1912	21,000	2,150		23,200
1913	14,600	0		14,600
1914	10,200	935	813	11,900
1915	15,000	1,990	4,980	22,000
1916	20,300	2,870	4,530	27,700
1917	11,500	(a)	392	11,900
1918	15,800	3,240	10,700	29,700
1919	14,400	2,510	4,090	21,000
1920	13,900	0	12,400	26,300
1921	14,300	0	9,230	23,500
Mean	17,100	2,990	5,890	21,000

a No diversion reported.

Exhibit A,

WATER POWER.

No water power is developed in the Laramie River drainage basin. The following table was compiled from topographic maps, except for the section between Little Laramie and North Laramie rivers, which is only approximate.

Elevations and distances along Laramie River from source to mouth.

Point on river.	Distance (miles). From source.	Distance (miles). Point to point.	Elevation above sea level (feet).	Descent (feet). Total.	Descent (feet). Per mile.
Contour crossing	0		9,100		
Do	.1	0.1	9,000	100	1,000
Do	1.0	.9	8,800	200	222
Do	2.1	1.1	8,700	100	91
Do	3.3	1.2	8,600	100	83
(Mouth of West Laramie River)	(4.9)				
Contour crossing	5.3	2.0	8,500	100	50
Do	8.2	2.9	8,400	100	34
Do	11.2	3.0	8,300	100	33
(Mouth of Nunn Creek)	(13.6)				
Contour crossing	14.5	3.3	8,200	100	30
Do	17.5	3.0	8,100	100	33
Do	20.3	2.8	8,000	100	36
(Mouth of McIntyre Creek)	(21.9)				
Contour crossing	23.7	3.4	7,900	100	29
NE. ¼ SW. ¼ sec. 7, T. 11 N., R. 76 W	25.3	1.6	7,840	60	37
Center sec. 1, T. 11 N., R. 77 W	26.8	1.5	7,800	40	27
SW. ¼ NW. ¼ sec. 23, T. 12 N., R. 77 W	28.8	2.0	7,700	100	50
South edge SW. ¼, sec. 10, T. 12 N., R. 77 W	31.5	2.7	7,660	40	15
SW. ¼ SE. ¼ sec. 4, T. 12 N., R. 77 W	33.1	1.6	7,635	25	16
Jelm	36.3	3.2	7,540	95	30
Mouth of Woods Creek	40.8	4.5	7,450	90	20
Head of Pioneer canal	44.1	3.3	7,340	110	33
Riverside ranch	52.0	7.9	7,230	110	14
NE. ¼ sec. 22 T. 14 N., R. 75 W	57.2	5.2	7,200	30	6
Line between Tps. 74 and 75	69.2	12.0	7,150	50	4
Highway bridge at Laramie	72.9	3.7	7,140	10	3
Howell	81.9	9.0	7,100	40	4
Mouth of Little Laramie River	94.0	12.1	7,060	40	3
Entrance to canyon (about line between Rs. 72 and 73)	111.7	17.7	6,800	260	15
Mouth of North Laramie River	149.7	38.0	4,450	2,350	62
Mouth	179.7	30.0	4,230	220	7

[fol. 2674] DEFENDANT'S EXHIBIT B

Same to Roy Portner, Ft. Collins.
Bruce Eaton, Eaton, Colo.
H. D. Parker, Greeley.

March 7, 1928.

Mr. A. C. Kluver, Water Supply & Storage Co., Fort Collins, Colo.

DEAR MR. KLUVER:

Request has been made to the writer by the State Engineer of Wyoming, for permission to establish automatic registers on all ditches diverting water from the Laramie River into the Poudre River, and to make measurements of such diversions from time to time, all in cooperation with this office, with the understanding that all records and data secured shall be furnished this office upon request.

His reason for making this request is that it has been reported to the Reclamation Bureau that the large quantities of water now being diverted by Colorado interests from the Laramie River, will so deplete the available water supplies in the Laramie River as to make unjustifiable the building of certain extensions to what is known as the Wheatland Project in Wyoming which the state authorities up there are seeking to have done.

This office of course has no authority to restrain the State Engineer of Wyoming coming into Colorado and making such investigations, even tho we were convinced that the result of such investigations might be inimical to the interests of our citizens.

Mr. Whiting, State Engineer, advises me that he would not want to make such investigations, however, if seriously objected to by this office.

At the present time it does not appear that such investigation would be detrimental to our interests, and if they are to be made I would prefer that they be made in a cooperative way, so that we would have access to all of the inform-
[fol. 2674a] ation obtained.

Prior to giving final reply to the State Engineer of Wyoming, I would first like to have an expression from you as

to whether you would oppose such investigation as inimical to the interests of your company.

An early reply will oblige.

Very truly yours, State Engineer.

MCH/be.

[fol. 2675] DEFENDANT'S EXHIBIT C

[Stamp:] Received Mar. 14, 1928. State Engineer of Colo.

Law Offices of Lawrence R. Temple, Fort Collins, Colo.

March 13, 1928.

Mr. M. C. Hinderlider, State Engineer, Denver, Colorado.

DEAR MR. HINDERLIDER:

Referring to your letter of March 7th to The Water Sup- Supply & Storage Company in the matter of a request of the State Engineer of Wyoming, to establish automatic registers in the Skyline Ditch:

You will understand that our company now has a register in the ditch and the diversions from the Larimie River are all measured, and have been measured for a great many years through that register. The register has been checked by your office on various occasions and is presumed to be correct.

We are perfectly willing to co-operate with Mr. Whiting in the ditch and the diversions from the Larimie River are being willing to turn our ditch over to the State of Wyoming for the purpose of giving it information which might lead to costly litigation at some time in the future.

Before agreeing to any investigation I feel it would be advisable to have a full understanding with the State of Wyoming and I therefore suggest that so far as our Company is concerned we would like a conference with the State officials of Wyoming and your office in order that we may arrive at a full understanding at just what they may have in view.

The officers of The Water Supply & Storage Company will be at your service in this matter at any time you may

desire and a conference may be had either in Cheyenne or Denver as you and Mr. Whiting may determine.

Yours truly, L. R. Temple.

LRT:AW.

[fol. 2676] DEFENDANT'S EXHIBIT D

[Stamp:] Received Mar. 22, 1928. State Engineer of Colo.

The Laramie-Poudre Irrigation Co.

H. D. Parker, Pres. G. F. Smith, Sec'y

Greeley, Colorado, March 16, 1928.

Hon. M. C. Hinderlider, State Engineer, State Capitol Building, Denver Colo.

In re: Automatic Registers, Greeley-Poudre Tunnel

MY DEAR MR. HINDERLIDER:

We have delayed answering yours of the 7th inst., in which you call attention to the request of the State Engineer of Wyoming for permission to establish automatic registers on all ditches diverting water from the Laramie River into the Poudre River, until we were able to discuss the matter with Delph E. Carpenter, who has been our counsel in such matters since 1911.

After consultation with Mr. Carpenter, we are firmly of the belief that there should be but one recording station on each intermountain division: that this station should be equipped with proper weirs and facilities for rating and measurement of water flow; that such station should be equipped with an automatic register for official record of depth of flow; that this register and the records made by it should be open to inspection of all interested parties and all officials of both the states of Colorado and Wyoming; and that all ratings should be made at such station and reports of such ratings made at once to the state water officials.

In this matter we respectfully call your attention to the fact that we have maintained an automatic register of most approved pattern at the rating station at the east portal of the Greeley-Poudre Tunnel, from the day water was first diverted through the tunnel. This station is maintained not only for our own information but, in compliance with

the statute, for the protection of the public and of other users of water from the Cache la Poudre River. It is operated under the supervision of state water officials and the charts from the register are forewarded to the Water Commissioner. We have always invited frequent ratings of flow at the wier by officials duly authorized and with adequate experience to perform such work and such rating as a part of the official records of your office. We maintain this rating station and equipment at our own expense. It is at all times open to inspection by all interested parties and we have no objection to the State Engineer of Wyoming or his duly authorized representative, visiting the station as frequently as he may wish and making as many meter measurements as he may desire. Our records, our automatic register and all our appliances are open to your inspection and to his at any and all times.

[fol. 2676a] We do, however, respectfully protest against the establishment of any other rating station or more than one rating station on our tunnel. It is acknowledged by all authorities that the measurement of water is not an exact science and that the records obtained at no two stations would be exactly the same. When to this is added the human equation with all its prejudice, it may be readily seen that a multiplicity of rating stations can but lead to confusion and disagreement.

Our rights to divert water from the Laramie to the Poudre are fixed and determined by the decision of the Supreme Court in the case of Wyoming vs. Colorado. We expect to divert water each year to the limit fixed by that decision, as soon as our works on the Laramie River side have been put in better condition. We have no intent to violate either the spirit or the letter of the decision in that case and wish our measurements of the water flow to be so carefully checked and recorded that no question may ever arise respecting the truth of our diversions. In this matter we earnestly solicit the cooperation of your office and have no objection to your publishing to the world the facts ascertained.

We note that the request of the State Engineer of Wyoming is predicated upon proposals to enlarge diversion of water from the Laramie River for the Wheatland project in Wyoming. The expansion of the irrigated area in Wyoming upon the basis of the water supply allotted to that state in the Wyoming-Colorado decision, is a matter of

the internal affairs of that state. However, if it is now proposed to enlarge the demands upon the water supply of the Laramie River over and above the demands existing in 1922, we desire to call your attention to the fact that the Greeley-Poudre project is senior in right to any new project in Wyoming and that the limitations placed upon our project by the decision in the Wyoming-Colorado case, does not express the limit of our physical ability to divert or the original intent of our appropriations from the Laramie River, all of which is clearly expressed in the decree of the District Court of Larimer County, Colorado, adjudicating water rights in Water District 48 and if expansion is to be made in Wyoming, we suggest that it should be without prejudice to our rights.

We thank you for your courtesy in soliciting an expression of our views befor taking official action and assure you of our cooperation.

Very truly yours, The Laramie-Poudre Irrigation Co., by H. D. Parker, President.

[fol. 2677] DEFENDANT'S EXHIBIT E

[Stamp:] Received Mar. 26, 1928. State Engineer of Colo.

The Eaton Investment Company

Capital Stock $1,000,000

Real Estate, Loans, Insurance

Owners of the Eaton Farms

Eaton, Colorado

Bruce G. Eaton, President.
Rea L. Eaton, Vice-President.
Rex C. Eaton, Secty. and Treas.
General Manager, Rex C. Eaton.

March 24th, 1928.

Mr. M. C. Hinderlider, Engineering Dept., The State Capitol, Denver, Colo.

DEAR MR. HINDERLIDER:

Your letter of March 7th addressed to my father Bruce G. Eaton received. I was in your office on March 22nd but

you were out of the city. I would prefer to talk this matter over with you personally, although I do not see as there would be any serious objection from our Company in regard to checking the water measurement from Colorado into Wyoming, however I shall be in Denver next week and at that time I shall try and see you.

Very truly yours, Rex C. Eaton.

[fol. 2678] DEFENDANT'S EXHIBIT F

In the Matter of the Adjudication of the Priority of Right to the Use of Water for Irrigation in Water District No. 48, State of Colorado

Findings

The following are the findings of fact and law by the Referee upon which the decree to be reported to the Court will be based in the matter of the adjudication of the priority of right to the use of water for irrigation in Water District No. 48, State of Colorado.

Ditches

The ditches in said District are named and numbered as follows:

No. 1—The Mansfield No. 2 Ditch.
No. 2—The Hills Ditch.
No. 3—The Warren Ditch.
No. 4—The Hance Ditch.
No. 5—The Stuck Creek Ditch.
No. 6—The Jim Creek Ditch.
No. 7—The Bliler & Boswell Ditch.
No. 8—The Mansfield Ditch.
No. 9—The Yelton Ditch.
No. 10—The Martin Ditch No. 1.
No. 11—The La Garde Ditch.
No. 12—The Ward Ditch No. 1.
No. 13—The Ward Ditch No. 2.
No. 14—The Jimmy Creek Ditch.
[fol. 2679] No. 15—The Smith's Brown Ditch.
No. 16—The Trollope Creek Ditch.
No. 17—The Homestead Ditch.

No. 18—The Martin Ditch No. 2.
No. 19—The Grace Creek Ditch.
No. 20—The Brown Ditch.
No. 21—The Lamb Ditch.
No. 22—The Laramie River Ditch.
No. 23—The Comet Ditch.
No. 24—The Forrester Ditch.
No. 25—The Pache Ditch.
No. 26—The Link Ditch No. 1.
No. 27—The Lone Tree Ditch.
No. 28—The French Woman Ditch.
No. 29—The Slough Creek Ditch.
No. 30—The Link Ditch No. 2.

The findings of the referee in respect to the ownership, location, size, date and amount of the several appropriations and the amount of land irrigated, are in respect to each of the said several ditches respectively, as follows:

No. 1—The Mansfield No. 2 Ditch

The ditch is owned by N. K. Boswell, and was constructed and used to irrigate 100 acres of land. It draws its supply of water from the Big Laramie River, with headgate upon the left bank of said stream and situated in the southwest quarter of the southeast quarter of Section 1, Town 11 North, Range 77 West, North 7 degrees and 25 minutes, East 662 feet from the quarter corner to Sections 1 and 12 in said Town and Range. It is 1.5 miles long, 4 feet wide on the bottom, 5 feet wide on the top, 1.5 feet deep, with a grade of 27.72 feet per mile. Its capacity is 19.84 [fol. 2680] cubic feet of water per second of time. It is entitled to Priority No. 1, by construtcion for 19.84 cubic — of water per second, to bear date June 1, 1880.

No. 2—The Hills Ditch

The ditch is owned by Joe H. Smith and James E. Smith, and is used to irrigate 200 acres of land.

It draws its supply of water from the Big Laramie River, with headgate upon the left bank of said stream and situated in the south east quarter of the south east quarter of Section 33, Town 11 North, Range 76 West, North 53 de-

grees and 40 minutes West 1035 feet from the south east corner of said Section 33.

It is 1.75 miles long, 5 feet wide on the bottom and top, 1.5 feet deep and has a grade of 6.17 feet per mile. Its capacity is 11 cubic feet per second.

It is entitled to Priority No. 2 by construction for 11 cubic feet of water per second of time, to bear date July 1, 1880.

No. 3—The Warren Ditch

The ditch is owned by Warren Bliler, and is used to irrigate 110 acres of land.

It draws its supply of water from the Big Laramie river, with headgate upon the left bank of said stream and situated in the north east quarter of the south west quarter of Section 26, Town 12, North Range 77 West, North 37 degrees and 50 minutes West 1665 feet from the quarter corner to Sections 26 and 35 in said Town and Range.

It is three quarters of a mile long, 3 feet wide on the bottom and 4.5 feet on the top, one foot deep, with a grade of 17.6 feet per mile. Its capacity is 6.67 cubic feet per second.

[fol. 2681] It is entitled to Priority No. 3 by construction for 6.67 cubic feet of water per second, to bear date March 25, 1881.

No. 4—The Hance Ditch

The ditch is owned by Charles A. Martin, and was constructed and is used to irrigate 200 acres of land.

It draws its supply of water from Grace Creek, a tributary of the Big Laramie River, with headgate upon the left bank of said stream and situated in the north west quarter of the north east quarter of Section 2, Town 11 North, Range 77 West, South 30 degrees 15 minutes East 1006 feet from the quarter corner to Sections 2 and 35 in Towns 11 and 12 North, Range 77 West.

It is 1.75 miles long, 6 feet wide on the bottom and top, 1.5 feet deep and has a grade of 12.14 feet per mile. Its capacity is 19.44 cubic feet per second.

It is entitled to Priority No. 4 by construction, for 19.44 cubic feet of water per second, to bear date March 31, 1881.

No. 5—The Stuck Creek Ditch

The ditch is owned by Warren Bliler and was constructed and is used to irrigate 165 acres of land.

It draws its supply of water from the Stuck Creek, a tributary of the Big Laramie river, with headgate upon the *left bank of said stream and situated in the south east quarter* of the south east quarter of Section 22, Town 12, North, Range 77 West, North 25 degrees and 50 minutes West 102 feet from the south east corner of said Section 22.

It is one half mile long, 2.5 feet wide on the bottom and 4 feet on top, 2 feet deep and has a grade of 17.52 feet per mile. Its capacity is 16.12 cubic feet per second.

[fol. 2682] It is entitled to Priority No. 5, by construction, for 16.12 cubic feet of water per second, to bear date April 1, 1881.

No. 6—The Jim Creek Ditch

The ditch is owned by James B. Arthur, and was constructed and is used to irrigate 160 acres of land.

It draws its supply of water from Jimmy Creek, a tributary of the Big Laramie river, with headgate upon the right bank of said stream and situated in the south west quarter of Section 36, Town 11 North, Range 76 West, North 31 degrees East 1875 feet from the corner to Sections 1, 2, 35 and 36, Towns 10 and 11 North, Range 76 West.

It is three fourths of a mile long, 4 feet wide on the bottom, 1.25 feet deep and has a grade of 5 feet per mile. Its capacity is 9 cubic feet per second.

It is entitled to Priority No. 6 by construction, for 9 cubic feet per second of time to bear date July 10, 1881.

No. 7—The Bliler & Boswell Ditch

The ditch is owned by Warren Bliler and N. K. Boswell, and was constructed and is used to irrigate 225 acres of land in Colorado and 300 acres in Wyoming.

It draws its supply of water from the Big Laramie river, with headgate upon the right bank of said stream in the north west quarter of the north east quarter of Section 35, Town 12, North, Range 77 West, South 23 degrees 40 minutes East 1002 feet from the quarter corner to Sections 26 and 35 in said Town and Range.

It is 4 miles long, 4.5 feet wide on the bottom. 6.5 feet on top, 1.8 feet deep and has a grade of 7.18 feet per mile. Its capacity is 16.43 cubic feet per second.

It is entitled to Priority No. 7, by construction, for 16.43 cubic feet of water per second, to bear date April 1, 1882.

[fol. 2683] No. 8—The Mansfield Ditch

The ditch is owned by N. K. Boswell and C. A. Martin, and was constructed and is used to irrigate 320 acres of land.

It draws its supply of water from the Big Laramie river, with headgate upon the right bank of said stream and situated in the south east quarter of the north east quarter of Section 12, Town 11 North, Range 77 West, South 3 degrees 45 minutes West 1698 feet from the north east corner of said section 12.

It is 3 miles long, 6 feet wide on the bottom, 8 feet on top, 1.5 feet deep, and has a grade of 4.8 feet per mile. Its capacity is 11.61 cubic feet per second.

It is entitled to Priority No. 8, by construction, for 11.61 cubic feet per second, to bear date April 20, 1882.

No. 9—The Yelton Ditch

The ditch is owned by Daniel Johnson, Coe & Carter and Joe H. Smith, and is used to irrigate 250 acres of land.

It draws its supply of water from the Big Laramie river with headgate upon the left bank of said stream and situated in the south west quarter of the north east quarter of Section 29, Town 11 North, Range 76 West, South 21 degrees 45 minutes East 2275 feet from the quarter corner to Sections 20 and 29 Town 11 North, Range 76 West.

It is 2.25 miles long, 5 feet wide on the bottom and top, 2.2 feet deep and has a grade of 21.43 feet per mile. Its capacity is 30.14 cubic feet per second.

It is entitled to Priority No. 9 by construction, for 30.14 cubic feet of water per second, to bear date July 1, 1882.

No. 10—The Martin Ditch No. 1

The ditch is owned by F. W. Sherwood, and was constructed and is used to irrigate 640 acres of land.

It draws its supply of water from the Big Laramie river, [fol. 2684] with headgate upon the right bank of said

stream, and situated in the north west quarter of the south east quarter of Section 15, Town 10 North, Range 76 West, South 26 degrees 45 minutes West 3282 feet from the north east corner of said Section 15.

It is 2.75 miles long, 6 feet wide on the bottom and 8 feet on top, 1.5 feet deep and has a grade of 6 feet per mile. Its capacity is 15.5 cubic feet per second.

It is entitled to Priority No. 10 by construction, for 15.5 cubic feet of water per second, to bear date April 20, 1883.

No. 11—The La Garde Ditch

The ditch is owned by Daniel Johnson, Tamerlane Forrester and J. H. Detro, and was constructed and is used to irrigate 150 acres of land.

It draws its supply of water from the left bank of La Garde Creek, a tributary of the Big Laramie river, with headgate siutated in the north west quarter of the north west quarter of Section 20, Town 11 North, Range 76 West, South 86 degrees 30 minutes East 616 feet from the north west corner of said Section 20.

It is 1.75 miles long, 3.5 feet wide on the bottom and 5.5 feet wide on top, 1.5 feet deep and has a grade of 14.10 feet per mile. Its capacity is 10.33 cubic feet per second.

It is entitled to Priority No. 11, by construction, for 10.33 cubic feet of water per second, to bear date June 10, 1883.

No. 12—The Ward Ditch No. 1

The ditch is owned by John L. Dagle and James B. Arthur, and was constructed and is used to irrigate 80 acres of land.

It draws its supply of water from Jimmy Creek, a tributary of the Big Laramie river, with headgate upon the right bank of said stream and situated in the south east [fol. 2685] quarter of the southeast quarter of Section 27, Town 11 North, Range 76 West, North no degrees and 20 minutes West 785 feet from the south west corner of Section 26, Town and Range aforesaid.

It is three fourths of a mile long, 4 feet wide on the bottom and 5 feet on top, 1 foot deep and has a grade of 8.97 feet per mile. Its capacity is 4.25 feet per second.

It is entitled to Priority No. 12, by construction, for 4.25 cubic feet of water per second, to bear date June 15, 1883.

No. 13—The Ward Ditch No. 2

The ditch is owned by John L. Dagle, and was constructed and used to irrigate 50 acres of land.

It draws its supply of water from Jimmy Creek, a tributary of the Big Laramie river, with headgate upon the left bank of said stream and situated in the south west quarter of the south west quarter of Section 26, Town 11 North, Range 76 West, North 6 degrees 45 minutes East 326 feet from the south east corner of Section 27 in said Town and Range.

It is 1 mile long, 4 feet wide, 1 foot deep, and has a grade of 53.48 feet per mile. Its capacity is 9.48 cubic feet per second.

It is entitled to Priority No. 13, by construction, for 9.48 cubic feet of water per second, to bear date July 1, 1883.

No. 14—The Jimmy Creek Ditch

The ditch is owned by Daniel Johnson and Coe & Carter, and was constructed and is used to irrigate 200 acres of land.

It draws its supply of water from Jimmy Creek and from the Big Laramie river, with its upper headgate upon the right bank of said Big Laramie river in the south east quarter of Section 20, Town 11 North, Range 76 West and with its Jimmy Creek crossing or headgate in the south [fol. 2686] east quarter of Section 17 of said Town and Range.

It is 1.75 miles long, 4.3 feet wide on the bottom, 5.3 feet wide on top, 1 foot deep and has a grade of 13.20 feet per mile. Its capacity is 5.52 cubic feet per second.

It is entitled to Priority No. 14, by construction, for 5.52 cubic feet of water per second from Jimmy Creek, to bear date June 1, 1884, and also to Priority No. 22, by extension of the Big Laramie river, for 5.52 cubic feet of water from said river when the amount cannot be obtained from Jimmy Creek, to bear date May 1, 1891.

No. 15—The Smiths' Brown Ditch

The ditch is owned by Joe H. Smith and James E. Smith, and was constructed and is used to irrigate 160 acres of land.

It draws its supply of water from the Big Laramie river with two headgates, one South 25 degrees 50 minutes East 3146 feet, and the other South 2 degrees 50 minutes East 1358 feet from the north east corner of Section 32, Town 11 North, Range 76 West.

It is 2.5 miles long, 6 feet wide on the bottom, 7 feet on top, 1.2 feet deep, and has a grade of 14.25 feet per mile. Its capacity is 16.53 cubic feet per second.

It is entitled to Priority No. 15, by construction, for 16.53 cubic feet of water per second, to bear date, June 10, 1884.

No. 16—The Trollope Creek Ditch

The ditch is owned by John L. Dagle, and was constructed and is used to irrigate 80 acres of land.

It draws its supply of water from Trollope Creek, a tributary of Jimmy Creek, a tributary of the Big Laramie river, with headgate upon the right bank of said Trollope Creek in the south west quarter of the south west quarter of Section 23, Town 11 North, Range 76 West.

[fol. 2687] It is one half mile long, 4 feet wide on the bottom, 5 feet on top, 1.5 feet deep and has a grade of 42.24 feet per mile. Its capacity is 17.75 cubic feet per second.

It is entitled to Priority No. 16, by construction, for 6.89 cubic feet of water per second, to bear date June 15, 1884. Also to Priority No. 30, by enlargement of the ditch, for 10.86 cubic feet of water per second, to bear date May 29, 1896.

No. 17—The Homestead Ditch

The ditch is owned by Victor G. H. Stuart and Alexander Stuart, and was constructed and is used to irrigate 100 acres of land.

It draws its supply of water from a branch of the McIntyre Creek, which is a tributary of the Big Laramie river, with headgate upon the left bank of said branch and situated in the north east quarter of the south east quarter

of Section 6, Town 10 North, Range 76 West, North 24 degrees, 50 minutes West 1800 feet from the south east corner of said Section 6.

It is three fourths of a mile long, 2 feet wide on the bottom, 3 feet on top, 1.5 feet deep and has a grade of 54.90 feet per mile. Its capacity is 9 cubic feet per second of time.

It is entitled to Priority No. 17, by construction, for 9 cubic feet of water per second, to bear date July 10, 1884.

No. 18—The Martin Ditch No. 2

The ditch is owned by F. W. Sherwood, and was constructed and is used to irrigate 640 acres of land.

It draws its supply of water from the Big Laramie river, with headgate upon the south west quarter of the north east quarter of Section 10, Town 10 North, Range 76 West, South 4 degrees 35 minutes East 1920 feet from the quarter corner to Sections 3 and 10 in said Town and Range.

[fol. 2688] Its length is three fourths of a mile. It is 6 feet wide on the bottom, 8 feet on top, 1.5 feet deep, and has a grade of 5.28 feet per mile. Its capacity is 14.5 cubic feet per second.

It is entitled to Priority No. 18, by construction, for 14.5 cubic feet of water per second, to bear date April 30, 1887.

No. 19—The Grace Creek Ditch

The ditch is owned by Laona E. Hance, and was constructed and is used to irrigate 80 acres of land.

It draws its supply of water from Grace Creek, a tributary of the Big Laramie river, with headgate upon the left bank of said stream and situated in the north west quarter of the north west quarter of Section 14, Town 11 North, Range 77 West, South 37 degrees 45 minutes East 574 feet from the north west corner of said Section 14.

It is 2.25 miles long, 3 feet wide on the bottom, 4 feet on top, 1 foot deep and has a grade of 8.97 feet per mile. Its capacity is 3.07 cubic feet per second.

It is entitled to Priority No. 19, by construction, for 3.07 cubic feet of water per second of time, to bear date April 1, 1888.

No. 20—The Brown Ditch

The ditch is owned by C. C. Forrester, and was constructed and is used to irrigate 100 acres of land.

It draws its supply of water from Nunn Creek, a tributary of the Big Laramie river, with headgate upon the right bank of said stream and situated in the north west quarter of the north west quarter of Section 36, Town 10 North, Range 76 West, about 900 feet south easterly from the north west corner of said Section 36.

[fol. 2689] It is three-fourths of a mile long, 5 feet wide, 2 feet deep and has a grade of six and two-thirds feet per mile. Its capacity is 10 cubic feet per second.

It is entitled to Priority No. 20, by construction, for 10 cubic feet of water per second, to bear date May 31, 1890.

No. 21—The Lamb Ditch

The ditch is owned by Clara N. Smith, and was constructed and is used to irrigate 160 acres of land.

It draws its supply of water from McIntyre Creek, a tributary of the Big Laramie river, with headgate upon the right bank of said stream and situated North 15 degrees 45 minutes East 2196 feet from the south west corner of Section 5, Town 10, North Range 76 West.

It is 1.25 miles long, 4 feet wide on the bottom, 5 feet on top, 1 foot deep, and has a grade of 5 feet per mile. Its capacity is 3.88 cubic feet per second.

It is entitled to Priority No. 21, by construction, for 3.88 cubic feet of water per second to bear date June 1, 1890.

No. 22—The Laramie River Ditch

The ditch is owned by The Water Supply & Storage Company, and was constructed and is used to irrigate 30,000 acres of land and for the filling of reservoirs.

Its headgate is located upon the right bank of the West branch of the Big Laramie River, at a point from which the quarter corner of Sections 11 and 14, Town 8 North, Range 76 West, bears North 10 degrees 16 minutes East 2817 feet. The ditch is smallest at is headgate and upper end, where it draws its chief supply of water from the West branch of the Big Laramie river, and it increases in size and capacity from the headgate down to its lower end at Chambers Lake

and intercepts and appropriates the waters of Two and a [fol. 2690] Half Mile Creek, Three Quarter Mile Creek, Half Mile Creek and other small branches crossing the line of the ditch between its headgate and its mouth. The capacity of the ditch at the headgate is 242 cubic feet per second, and it increases from this point towards the lower end of the ditch to a capacity of 400 cubic feet per second. It appropriates 242 cubic feet of water at its headgate from said West branch and appropriates all the waters of the streams intercepting the line of the ditch and crossing the same, up to a total of 400 cubic feet of water per second of time.

The ditch is 5 miles long, 12 feet wide on the bottom, 18 feet wide at the top, 5.5 feet deep, and its grade is 15.84 feet per mile at the lower end, 5.28 feet per mile through the middle, and 10 feet per mile at the headgate.

The ditch is entitled to Priority No. 23 by construction, of 242 cubic feet of water per second at the headgate, and 158 cubic feet per second from tributaries crossing the line of the ditch, being a total appropriation of 400 cubic feet of water per second of time, all of which bears date from the 7th day of August A. D. 1891.

No. 23—The Comet Ditch

The ditch is owned by Victor G. H. Stuart, and was constructed and is used to irrigate 280 acres of land.

It draws its supply of water from McIntyre Creek, a tributary of the Big Laramie river, with headgate upon the left bank of said stream in the north west quarter of the north east quarter of Section 17, Town 10, Range 76 West, South 14 degrees 45 minutes East 1288 feet from the quarter corner to Sections 8 and 17 in said Town and Range.

It is 9,190 feet long, 5 feet wide on the bottom, 7 feet at [fol. 2691] the top, 1 foot deep, and has a grade of 7.12 feet per mile. Its capacity is 7.4 cubic feet per second.

It is entitled to Priority No. 24, by construction, for 7.4 cubic feet of water per second, to bear date December 7, 1892.

No. 24—The Forrester Ditch

The ditch is owned by C. C. Forrester, and was constructed and is used to irrigate 80 acres of land.

It draws its supply of water from Brown Creek, a tributary of the Big Laramie river, with headgate upon the right bank of said stream in the north west quarter of Section 25, Town 10 North, Range 76 West.

It is three fourths of a mile long, 4 feet wide, 1.5 feet deep, and has a grade of six and two thirds feet per mile. Its capacity is 7 cubic feet per second.

It is entitled to Priority No. 25, by construction, for 7 cubic feet of water per second of time, to bear date May 15, 1893.

No. 25—The Pache Ditch

The ditch is owned by August Pache, and was constructed and is used to irrigate 220 acres of land.

It draws its supply of water from La Garde Creek, a tributary of the Big Laramie river, with headgate upon the right bank of said stream, and situated in the north east quarter of the north west quarter of Section 31, Town 11 North, Range 76 West, South 61 degrees West 1118 feet from the quarter corner to Sections 30 and 31 in said Town and Range.

It is 1.25 miles long, 4 feet wide, 1.2 feet deep and has a grade of 57.55 feet per mile. Its capacity is 18.14 cubic feet per second.

It is entitled to Priority No. 26, by construction, for 18.14 [fol. 2692] cubic feet of water per second, to bear date May 25, 1893.

No. 26—The Link Ditch No. 1

The ditch is owned by Mary E. Link, and was constructed and is used to irrigate 200 acres of land.

It draws its supply of water from the Big Laramie river, with headgate upon the right bank of said stream and situated in the south east quarter of the north east quarter of Section 11, Town 9 North, Range 76 West, about 660 feet North of the center line of said Section 11.

It is 1.75 miles long, 6 feet wide on the bottom, 7 feet on top, 18 inches deep and has a grade of 5 feet per mile. Its capacity is 14.22 cubic feet per second.

It is entitled to Priority No. 27, by construction, for 14.22 cubic feet of water per second, to bear date June 1, 1894.

No. 27—The Lone Tree Ditch

The ditch is owned by F. W. Sherwood, and was constructed and is used to irrigate 200 acres of land.

It draws its supply of water from Lone Tree Creek, a tributary of the Big Laramie river, with headgate upon the right bank of said stream and situated in the south west quarter of Section 11, Town 10 North, Range 76 West, South 51 degrees 10 minutes East 2108 feet from the quarter corner to Section 10 and 11 in said Town and Range.

It is one half mile long, 6 feet wide on the bottom, 8 feet on the top, 1.5 feet deep and has a grade of 15.84 feet per mile. Its capacity is 25 feet per second of time.

It is entitled to Priority No. 28, by construction, for 25 cubic feet of water per second, to bear date October 24, 1894.

No. 28—The French Woman Ditch

The ditch is only in process of building, and is not en- [fol. 2693] titled to an absolute decree at this time. It is owned by John L. Dagle and is intended to be used to irrigate 120 acres of land.

Its headgate is upon the left bank of the French Woman Creek a tributary of Jimmy Creek, which is tributary to the Big Laramie river, and is situated in the north east quarter of the north west quarter of Section 22, Town 11 North, Range 76, West, North 33 degrees 55 minutes West 6310 feet from the south east corner of said Section 22.

Its proposed length is 1.25 miles, width, 4 feet on the bottom and 5 feet on top, depth, 1 foot, and grade 26.40 feet per mile. Its proposed capacity is 7.56 cubic feet per second.

If the ditch shall be completed and the water actually appropriated and applied to irrigation within a reasonable time from the commencement of the work thereon, according to the nature of the work of constructing said ditch and in accordance with the plan thereof heretofore given in evidence, the said ditch will be entitled to Priority No. 29, by construction, for 7.56 cubic feet of water per second to bear date May 28, 1896.

No. 29—The Slough Creek Ditch

The ditch is owned by Charles A. Martin and is used and was constructed to irrigate 35 acres of land.

Its draws its supply of water from Slough Creek, a tributary of Grace Creek, which is a tributary of the Big Laramie river, with headgate upon the left bank of said stream and situated in the north west quarter of the south west quarter of Section 2, Town 11 North, Range 77 West, South 14 degrees 5 minutes East 465 feet from the quarter corner to Sections 2 and 3 in said Town and Range.

It is three fourths of a mile long, 3 feet wide on the bottom, 4 feet on top, 1.5 feet deep, and has a grade of 5.28 [fol. 2694] feet per mile. Its capacity is 4.11 cubic feet per second of time.

It is entitled to Priority No. 31, by construction, for 4.11 cubic feet of water per second, to bear date May 30, 1896.

No. 30—The Link Ditch No. 2

The ditch is owned by Wallis A. Link, and was constructed and is used to irrigate 50 acres of land.

It draws its supply of water from a branch of the Big Laramie river, with headgate in the north east quarter of the north west quarter of Section 2, Town 9 North, Range 76 West.

It is three fourths of a mile long, 3 feet wide on the bottom, 3.5 feet on top, 8 inches deep, and has a grade of 5 feet per mile. Its capacity is 2 cubic feet per second.

It is entitled to Priority No. 32, by appropriation, for 2 cubic feet per second of time, to bear date from the 15th day of June A. D. 1896.

Reservoirs

Priority No. 1

Reservoir Nos. 1, 2, 3, 4, and 5 and Chambers Lake, belonging to the Water Supply & Storage Company.

The Water Supply & Storage Company is the owner of Reservoirs Nos. 1, 2, 3, 4, and 5 and Chambers Lake. They are storage reservoirs of water to be used for irrigation, and have jointly a storage capacity of 500,000,000 cubic feet. Water has been stored therein taken from the Laramie river and its tributaries by means of the Laramie River Ditch, during the seasons of 1894, 1895 and 1896, when not needed for immediate use for irrigation. The storage right runs concurrent with the date of the construction of said

the Laramie River Ditch. The said The Water Supply & Storage Company is entitled to Reservoir Priority No. 1 of [fol. 2695] this Water District, for all its said reservoirs jointly, viz. Nos. 1, 2, 3, 4, and 5 and Chambers Lake, by appropriation of water and construction of the Laramie River Ditch, to the amount of 500,000,000 cubic feet annually, which priority bears date the 7th day of August, A. D. 1891.

The above and foregoing findings upon the thirty ditches and the six reservoirs of The Water Supply & Storage Company concerning which testimony has been offered in this matter, and upon which the decree is based, constitute all the special findings of the referee in this proceeding.

(Signed) Jno. C. Hanna, Referee.

[fol. 2696] IN THE DISTRICT COURT

STATE OF COLORADO,
County of Larimer, ss:

In the Matter of the Adjudication of the Priority of Right to the Use of Water for Irrigation in Water District No. 48, State of Colorado.

DECREE

Now on this 30th day of October, A. D. 1896, this matter coming on for final hearing and adjudication upon the report of John C. Hanna, referee appointed herein, to whom this matter was, by order of this Court, herein entered on the 14th day of September, A. D. 1895, referred for the purposes in said order mentioned, as well upon the several findings upon the evidence produced in this matter, as upon the said evidence taken by and before the said referee, and the Court being satisfied, from the several returns of notices, certificates of publication, affidavits and certificates of the said referee, respectively, that the said testimony returned, and upon which the findings herein returned have severally been made, was taken upon due and lawful notice, in all respects according to the provisions of the statute in such case made and provided and the rules and several orders of the Court in that behalf in this matter made and entered; and further, that the notice of the time set for filing exceptions in this matter to said report

and findings, and of the time set for the final hearing thereof and of this cause, have been duly served on all the parties entitled to notice under the order of this Court in that behalf entered, in manner and form as by the said order re-
[fol. 2697] quired; and further, that all interested in this matter and entitled to notice in any stage of the proceedings therein, have at all times been duly notified according to law and the order of this Court; and the report of the said referee, together with the returns of service of notices, affidavits, abstract and findings, being found in due form, and the Court having now here in open Court heard all parties and their attorneys so far as they desired to be heard, respectively, touching the several matters herein, it is by the Court, in consideration of all the premises, hereby ordered and adjudged that the several findings of the said referee, as reported to and filed in this Court, be in all things approved and confirmed, and that they be taken, deemed and held in all respects as the findings of this Court in this matter; and further, it is upon like consideration by the Court here ordered, adjudged and decreed in respect to all and singular the said findings of the said referee, in respect to each ditch, canal and reservoir in said findings numbered 1 to 30 inclusive as found in that certain book numbered III, and marked "Referee's Findings", and as the same are hereinafter mentioned and designated in separate paragraphs hereof, as hereinafter in said several paragraphs severally set forth; subject, however, to the following next mentioned provisions, to-wit:

1. No part of this decree shall in any case be taken, deemed or held to confirm, impair or in any manner affect any claim of right or property held or claimed by any person, association or corporation in or to any ditch, canal or reservoir, or any part thereof, or the land or any part thereof on which any such ditch, canal or reservoir may be situated, or the land held or claimed as right of way of any of them, or any right, interest or claim of property whatever, in or relating to any of them.

[fol. 2698] 2. No part of this decree shall be taken, deemed or held as affecting in any manner any question or claim of right between the owners or claimants of any such ditch, canal or reservoir, as between each other, whether as part owners or shareholders therein, or as stockholders in any

corporation or joint stock company claiming or to claim the same or any part thereof, nor shall it affect the rights, interests or claims of any consumers of water for irrigation or domestic purposes, whether as part owner, lessee, shareholder or stockholder in any corporation holding or controlling the same, or as purchaser of water therefrom, as against the rights, interest, or claims of any other party or parties interested, or claiming interest or rights in or to such ditch, canal or reservoir as owner, lessee or part owner thereof, or as shareholder or stockholder in any corporation claiming the same or as purchaser of water therefrom. Neither shall it affect any claim of priority made or resisted as between parties using water for said purposes from the same ditch, canal or reservoir, as to such water.

3. No part of this decree shall in any manner affect any question between two or more parties claiming or owning priorities as herein adjudged, on the same stream, in any case where the water in such stream sinks and rises to the surface again between the locations of the headgates of their respective ditches or canals, or in any dispute as to the identity of the water appropriated by either party out of such sinking and rising stream.

4. This decree shall not affect any question of priority between claimants or owners of ditches or canals used in whole or in part for milling or manufacturing or water power for other purposes as to any water carried in such ditches or canals for said purposes.

5. This decree shall not affect any claim, interest or [fol. 2699] right of any corporation as the right of property in any ditch, canal or reservoir, or the ground on which the same may be situated, or any question which may arise between the stockholders thereof or between them and the State, people or any party, upon the dissolution of such corporation by expiration of its charter or otherwise, as to any appropriation of water or rights secured by condemnation proceeding by such corporation during its legal existence.

6. No part of this decree shall affect in any way any right, claim or interest now or hereafter held or claimed to any appropriation of water made after the closing of testimony touching the construction or enlargements of

the ditch, canal or reservoir by means of which such appropriation may have been made.

7. No part of this decree shall be taken, deemed or held as adjudging to any claimant or present or future representative of any claim to any ditch or canal or reservoir, or party holding, using or controlling the same, any right to take and carry by means of any ditch, canal or reservoir herein mentioned, or by virtue of any appropriation herein adjudged, any water from any natural stream except to be applied to the use for which such appropriation has been made; nor to allow any excessive use or waste of water whatever; nor to allow any diversion of water except for lawful and beneficial uses.

8. This decree shall be taken, deemed and held as intended to determine and establish the several priorities of right by appropriation of water from the streams of said Water District No. 48, for irrigation, of the several ditches, canals and reservoirs in said district, concerning which testimony has been offered in this matter, each according to the construction, enlargement or extension thereof, with the amount of water held to have been appropriated thereby.

[fol. 2700] Subject to the several last mentioned eight provisions it is further, as to said ditches, canals and reservoirs, and the several appropriations of water by means of them respectively claimed in this matter, ordered, adjudged and decreed, as in and by the findings of said referee is found, as follows:

That said ditches be and the same are hereby numbered according to the date of their several and respective constructions, and said dates are hereby determined and declared to be as follows:

No. 1—The Mansfield No. 2 Ditch ..... June 1, 1880
No. 2—The Hills Ditch ..... July 1, 1880
No. 3—The Warren Ditch ..... March 25, 1881
No. 4—The Hance Ditch ..... March 31, 1881
No. 5—The Stuck Creek Ditch ..... April 1, 1881
No. 6—The Jim Creek Ditch ..... July 10, 1881
No. 7—The Bliler and Boswell Ditch ..... April 1, 1882

No. 8—The Mansfield Ditch ..... April 20, 1882
No. 9—The Yelton Ditch ..... July 1, 1882
No. 10—The Martin Ditch No. 1 ..... April 20, 1883
No. 11—The La Garde Ditch ..... June 10, 1883
No. 12—The Ward Ditch No. 1 ..... June 15, 1883
No. 13—The Ward Ditch No. 2 ..... July 1, 1883
No. 14—The Jimmy Creek Ditch ..... June 1, 1884
No. 15—The Smiths' Brown Ditch ..... June 10, 1884
No. 16—The Trollope Creek Ditch ..... June 15, 1884
No. 17—The Homestead Ditch ..... July 10, 1884
No. 18—The Martin Ditch No. 2 ..... April 30, 1887
No. 19—The Grace Creek Ditch ..... April 1, 1888
No. 20—The Brown Ditch ..... May 31, 1890
No. 21—The Lamb Ditch ..... June 1, 1890
No. 22—The Laramie River Ditch ..... August 7, 1891

[fol. 2701]

No. 23—The Comet Ditch ..... December 7, 1892
No. 24—The Forrester Ditch ..... May 15, 1893
No. 25—The Pache Ditch ..... May 25, 1893
No. 26—The Link Ditch No. 1 ..... June 1, 1894
No. 27—The Lone Tree Ditch ..... October 24, 1894
No. 28—The French Woman Ditch (conditioned) ..... May 28, 1896
No. 29—The Slough Creek Ditch ..... May 30, 1896
No. 30—The Link Ditch No. 2 ..... June 15, 1896

And the several appropriations of water for said ditches and their respective enlargements and extensions are hereby numbered and declared, with the dates of said appropriations, to be as follows:

No. 1—The Mansfield No. 2 Ditch, original construction, June 1, 1880
No. 2—The Hills Ditch, original construction, July 1, 1880
No. 3—The Warren Ditch, original construction, March 25, 1881
No. 4—The Hance Ditch, original construction, March 31, 1881
No. 5—The Stuck Creek Ditch, original construction, April 1, 1881
No. 6—The Jim Creek Ditch, original construction, July 10, 1881

No. 7—The Bliler & Boswell Ditch, original construction, April 1, 1882

No. 8.—The Mansfield Ditch, original construction, April 20, 1882

No. 9—The Yelton Ditch, original construction, July 1, 1882

No. 10—The Martin Ditch No. 1, original construction, April 20, 1883

No. 11—The LaGarde Ditch, original construction, June 10, 1883

No. 12—The Ward Ditch No. 1, original construction, June 15, 1883

No. 13—The Ward Ditch No. 2, original construction, July 1, 1883

No. 14—The Jimmy Creek Ditch, original construction, June 1, 1884

No. 15—The Smiths' Brown Ditch, original construction, June 10, 1884

No. 16—The Trollope Creek Ditch, original construction, June 15, 1884

[fol. 2702]

No. 17—The Homestead Ditch, original construction, July 10, 1884

No. 18—The Martin Ditch No. 2, original construction, April 30, 1887

No. 19—The Grace Creek Ditch, original construction, April 1, 1888

No. 20—The Brown Ditch, original construction, May 31, 1890

No. 21—The Lamb Ditch, original construction, June 1, 1890

No. 22—The Jimmy Creek Ditch, extension to river, May 1, 1891

No. 23—The Laramie River Ditch, original construction, Aug. 7, 1891

No. 24—The Comet Ditch, original construction, Dec. 7, 1892

No. 25—The Forrester Ditch, original construction, May 15, 1893

No. 26—The Pache Ditch, original construction, May 25, 1893

No. 27—The Link Ditch No. 1, original construction, June 1, 1894

No. 28—The Lone Tree Ditch, original construction, Oct. 24, 1894
No. 29—The French Woman Ditch, original construction, conditioned, May 28, 1896
No. 30—The Trollope Creek Ditch, enlargement, May 29, 1896
No. 31—The Slough Creek Ditch, original construction, May 30, 1896.
No. 32—The Link Ditch No. 2, original construction, June 15, 1896

And said ditches are entitled to said appropriations and priorities on the aforesaid numbers as follows:

No. 1—The Mansfield No. 2 Ditch,
Priority No. 1 ..... June 1, 1880
No. 2—The Hills Ditch,
Priority No. 2 ..... July 1, 1880
No. 3—The Warren Ditch,
Priority No. 3 ..... March 25, 1881
No. 4—The Hance Ditch,
Priority No. 4 ..... March 31, 1881
No. 5—The Stuck Creek Ditch,
Priority No. 5 ..... April 1, 1881
No. 6—The Jim Creek Ditch,
Priority No. 6 ..... July 10, 1881
No. 7—The Bliler and Boswell Ditch,
Priority No. 7 ..... April 1, 1882
No. 8—The Mansfield Ditch,
Priority No. 8 ..... April 20, 1882
No. 9—The Yelton Ditch,
Priority No. 9 ..... July 1, 1882
[fol. 2703] No. 10—The Martin Ditch No. 1,
Priority No. 10 ..... April 20, 1833
No. 11—The La Garde Ditch,
Priority No. 11 ..... June 10, 1883
No. 12—The Ward Ditch No. 1,
Priority No. 12 ..... June 15, 1883
No. 13—The Ward Ditch No. 2,
Priority No. 13 ..... July 1, 1883
No. 14—The Jimmy Creek Ditch,
Priority No. 14 ..... June 1, 1884
Priority No. 22 ..... May 1, 1891
No. 15—The Smiths' Brown Ditch,
Priority No. 15 ..... June 10, 1884

No. 16—The Trollope Creek Ditch,
Priority No. 16 ..... June 15, 1884
Priority No. 30 ..... May 29, 1896
No. 17—The Homestead Ditch,
Priority No. 17 ..... July 10, 1884
No. 18—The Martin Ditch No. 2,
Priority No. 18 ..... April 30, 1887
No. 19—The Grace Creek Ditch,
Priority No. 19 ..... April 1, 1888
No. 20—The Brown Ditch,
Priority No. 20 ..... May 31, 1890
No. 21—The Lamb Ditch,
Priority No. 21 ..... June 1, 1890
No. 22—The Laramie River Ditch,
Priority No. 23 ..... Aug. 7, 1891
No. 23—The Comet Ditch,
Priority No. 24 ..... Dec. 7, 1892
No. 24—The Forrester Ditch,
Priority No. 25 ..... May 15, 1893
No. 25—The Pache Ditch,
Priority No. 26 ..... May 25, 1893
No. 26—The Link Ditch No. 1,
Priority No. 27 ..... June 1, 1894
No. 27—The Lone Tree Ditch,
Priority No. 28 ..... Oct. 24, 1894
No. 28—The French Woman Ditch,
Priority No. 29 (conditioned) ..... May 28, 1896
[fol. 2704] No. 29—The Slough Creek Ditch,
Priority No. 31 ..... May 30, 1896
No. 30—The Link Ditch No. 2,
Priority No. 32 ..... June 15, 1896

And more particularly in regard to the said several ditches, canals and reservoirs, respectively, as follows:

No. 1—The Mansfield No. 2 Ditch

That ditch numbered One, named the Mansfield No. 2 Ditch, N. K. Boswell, claimant, is a ditch constructed and used for the irrigation of one hundred acres of land; it draws its water supply from the Big Laramie river, with headgate upon the left bank of said stream and situated in the southwest quarter of the southeast quarter of sec-

tion 1, Town 11 North, Range 77 West, North 7 degrees and 25 minutes East 662 feet from the quarter corner to Sections 1 and 12 in said Town and Range, and entitled by appropriation to use of water from said stream to Priority Number One by construction thereof, and thereby to the quantity of water with the number and date of the priority of the appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream for the use and benefit aforesaid under and by virtue of said appropriation by construction, Priority Number One, nineteen and eighty-four hundredths cubic feet of water per second of time, or so much thereof as may be necessary to irrigate one hundred acres of land, the [fol. 2705] appropriation of which water took effect on, and said priority dates from the first day of June, A. D. 1880.

No. 2—The Hills Ditch

That ditch numbered Two, named the Hills Ditch, Joe H. Smith and James E. Smith, claimants, is a ditch constructed and used for the irrigation of two hundred acres of land; it draws its supply of water from the Big Laramie river, with headgate upon the left bank of said stream and situated in the southeast quarter of the southeast quarter of Section 33, Town 11 North, Range 76 West, North 53 degrees and 40 minutes West 1035 feet from the southeast corner of said section 33, and entitled by appropriation to use of water from said stream to Priority Number Two, by construction thereof, and thereby to the quantity of water with the number and date of the priority of the appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream, for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number Two, eleven cubic feet of water per second of time, or so much thereof as may be necessary to irrigate two hundred acres of land, the appropriation of which water took effect on, and said priority dates from the first day of July, A. D. 1880.

No. 3—The Warren Ditch

That ditch numbered Three, named the Warren Ditch, Warren Bliler, claimant, is a ditch constructed and used for the irrigation of one hundred and ten acres of land; it draws its supply of water from the Big Laramie river, with headgate upon the left bank of said stream and situated in the northeast quarter of the southwest quarter of Section 26, Town 12 North, Range 77 West, North 37 de- [fol. 2706] grees and 50 minutes West 1665 feet from the quarter corner to Sections 26 and 35 in said Town and Range, and entitled by appropriations to use of water from said stream to Priority Number Three, by construction thereof, and thereby to the quantity of water with the number and date of the priority of the appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream, for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number Three, six and sixty-seven hundredths cubic feet of water per second of time, or so much thereof as may be necessary to irrigate one hundred and ten acres of land, the appropriation of which water took effect on, and said priority dates from the 25th day of March, A. D. 1881.

No. 4—The Hance Ditch

That ditch numbered Four, named the Hance Ditch, Charles A. Martin, claimant, is a ditch constructed and used for the irrigation of two hundred acres of land; it draws its supply of water from Grace Creek, a tributary of the Big Laramie river, with headgate upon the left bank of said stream and situated in the northwest quarter of the northeast quarter of Section 2, Town 11 North, Range 77 West, South 30 degrees 15 minutes East 1006 feet from the quarter corner to Sections 2 and 35 in Towns 11 and 12 North, Range 77 West, and entitled by appropriation to use of water from said stream to Priority Number Four, [fol. 2707] by construction thereof, and thereby to the quantity of water with the number and date of the priority of the appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties

lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream, for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number Four, nineteen and forty-four hundredths cubic feet of water per second of time, or so much thereof as may be necessary to irrigate two hundred acres of land, the appropriation of which water took effect on, and said priority dates from the 31st day of March, A. D. 1881.

No. 5—The Stuck Creek Ditch

That ditch numbered Five, named the Stuck Creek Ditch, Warren Bliler, claimant, is a ditch constructed and used for the irrigation of one hundred and sixty-five acres of land; it draws its supply of water from Stuck Creek, a tributary of the Big Laramie river, with headgate upon the left bank of said stream and situated in the southeast quarter of the southeast quarter of Section 22, Town 12 North, Range 77 West, North 25 degrees and 50 minutes West 102 feet from the southeast corner of said Section 22, and entitled by appropriation to use of water from said stream to Priority Number Five, by construction thereof, and thereby to the quantity of water with the number and date of the priority of the appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; [fol. 2708] it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream, for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number Five, sixteen and twelve hundredths cubic feet of water per second of time, or so much thereof as may be necessary to irrigate one hundred and sixty-five acres of land, the appropriation of which water took effect on, and said priority dates from the first day of April, A. D. 1881.

No. 6—The Jim Creek Ditch

That ditch numbered Six, named the Jim Creek Ditch, James B. Arthur, claimant, is a ditch constructed and used for the irrigation of one hundred and sixty acres of land; it draws its supply of water from Jimmy Creek, a tributary of the Big Laramie river, with headgate upon the right

bank of said stream and situated in the southwest quarter of Section 36, Town 11 North, Range 76 West, North 31 degrees East 1875 feet from the corner to Sections 1, 2, 35 and 36, Towns 10 and 11 North, Range 76 West, and entitled by appropriation to use of water from said stream to Priority Number Six, by construction thereof, and thereby to the quantity of water with the number and date of the priority of the appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream, for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number Six, nine cubic feet of water per second of time or so much thereof as may be necessary to irrigate one hundred and sixty acres of land, the appropriation of which water took effect on, and said priority dates from the 10th day of July, A. D. 1881.

[fol. 2709] No. 7—The Biller and Boswell Ditch

That ditch numbered Seven, named the Bliler and Boswell Ditch, Warren Bliler and N. K. Boswell, claimants, is a ditch constructed and used for the irrigation of two hundred and twenty-five acres of land in Colorado and three hundred acres in Wyoming; it draws it supply of water from the Big Laramie river, with headgate upon the right bank of said stream in the northwest quarter of the northeast quarter of Section 35, Town 12 North, Range 77 West, South 23 degrees 40 minutes East 1002 feet from the quarter corner to sections 26 and 35 in said Town and Range, and entitled by appropriation to use of water from said stream to Priority Number Seven, by construction thereof, and thereby to the quantity of water with the number and date of the priority of the appropriation thereof, hereinafter mentioned, for the used aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream, for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number Seven, sixteen and forty-three hundredths cubic feet of water per second of time, or so much thereof as may be necessary to irrigate Five

Hundred and Twenty-five acres of land, the appropriation of which water took effect on, and said priority dates from the first day of April, A. D. 1882.

[fol. 2710] No. 8—The Mansfield Ditch

That ditch numbered Eight, named the Mansfield Ditch, N. K. Boswell and C. A. Martin, claimants, is a ditch constructed and used for the irrigation of three hundred and twenty acres of land; it draws its supply of water from the Big Laramie river, with headgate upon the right bank of said stream and situated in the southeast quarter of the northeast quarter of Section 12, Town 11 North, Range 77 West, South 3 degrees 45 minutes West 1698 feet from the northeast corner of said Section 12, and entitled by appropriation to use of water from said stream to Priority Number Eight, by construction thereof, and thereby to the quantity of water with the number and date of the priority of the appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream, for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number Eight, eleven and sixty-one hundredths cubic feet of water per second of time, or so much thereof as may be necessary to irrigate three hundred and twenty acres of land, the appropriation of which water took effect on and said priority dates from the 20th day of April, A. D. 1882.

[fol. 2711] No. 9—The Yelton Ditch

That ditch numbered Nine, named the Yelton Ditch, Coe & Carter, Daniel Johnson and Joe H. Smith claimants, is a ditch constructed and used for the irrigation of two hundred and fifty acres of land; it draws its supply of water from the Big Laramie river, with headgate upon the left bank of said stream and situated in the south west quarter of the north east quarter of Section 29, Town 11 North, Range 76 West, South 21 degrees 45 minutes East 2275 feet from the quarter corner to sections 20 and 29, Town 11 North, Range 76 West, and entitled by appropriation to use of water from said stream to Priority Number Nine, by

construction thereof, and thereby to the quantity of water with the number and date of the priority of the appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream, for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number Nine, thirty and fourteen hundredths cubic feet of water per second of time, or so much thereof as may be necessary to irrigate two hundred and fifty acres of land, the appropriation of which water took effect on, and said priority dates from the first day of July, A. D. 1882.

[fol. 2712] No. 10—The Martin Ditch No. 1

That ditch numbered Ten, named the Martin Ditch No. 1, F. W. Sherwood claimant, is a ditch constructed and used for the irrigation of six hundred and forty acres of land; it draws its supply of water from the Big Laramie river, with headgate upon the right bank of said stream and situated in the north west quarter of the south east quarter of Section 15, Town 10 North, Range 76 West, South 26 degrees 45 minutes West 3282 feet from the north east corner of said Section 15, and entitled by appropriation to use of water from said stream to Priority Number Ten, by construction thereof, and thereby to the quantity of water with the number and date of the priority of the appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream, for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number Ten, fifteen and one half cubic feet of water per second of time, or so much thereof as may be necessary to irrigate six hundred and forty acres of land, the appropriation of which water took effect on, and said priority dates from the 20th day of April, A. D. 1883.

[fol. 2713] No. 11—The La Garde Ditch

That ditch numbered Eleven, named the La Garde Ditch, Daniel Johnson, Tamerlane Forrester and J. H. Detro

claimants, is a ditch constructed and used for the irrigation of one hundred and fifty acres of land; it draws its supply of water from the left bank of La Garde Creek, a tributary of the Big Laramie river, and is situated in the north west quarter of the north west quarter of Section 20, Town 11 North, Range 76 West, South 86 degrees 30 minutes East 616 feet from the north west corner of said Section 20, and entitled by appropriation to use of water from said stream to Priority Number Eleven, by construction thereof, and thereby to the quantity of water with the number and date of the priority of the appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number Eleven, ten and thirty-three hundredths cubic feet of water per second of time, or so much thereof as may be necessary to irrigate one hundred and fifty acres of land, the appropriation of which water took effect on, and said priority dates from the 10th day of June, A. D. 1883.

[fol. 2714] No. 12—The Ward Ditch No. 1

That ditch numbered Twelve, named the Ward Ditch No. 1, John L. Dagle and James B. Arthur claimants, is a ditch constructed and used for the irrigation of eighty acres of land; it draws its supply of water from Jimmy Creek, a tributary of the Big Laramie river, with headgate upon the right bank of said stream and situated in the south east quarter of the south east quarter of Section 27, Town 11 North, Range 76 West, North no degrees and 20 minutes West 785 feet from the south west corner of Section 26, Town and Range aforesaid, and entitled by appropriation to use of water from said stream to Priority Number Twelve, by construction thereof, and thereby to the quantity of water with the number and date of the priority of the appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream, for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority

Number Twelve, four and twenty-five hundredths cubic feet of water per second of time, or so much thereof as may be necessary to irrigate eighty acres of land, the appropriation of which water took effect on, and said priority dates from the 15th day of June, A. D. 1883.

[fol. 2715] No. 13—The Ward Ditch No. 2

That ditch numbered Thirteen, named the Ward Ditch No. 2, John L. Dagle claimant, is a ditch constructed and used for the irrigation of fifty acres of land; it draws its supply of water from Jimmy Creek, a tributary of the Big Laramie river, with headgate upon the left bank of said stream and situated in the south west quarter of the south west quarter of Section 26, Town 11 North, Range 76 West, North 6 degrees 45 minutes East 326 feet from the south east corner of Section 27 in said Town and Range, and entitled by appropriation to use of water from said stream to Priority Number Thirteen, by construction thereof, and thereby to the quantity of water with the number and date of the priority of the appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream, for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number Thirteen, nine and forty-eight hundredths cubic feet of water per second of time, or so much thereof as may be necessary to irrigate fifty acres of land, the appropriation of which water took effect on, and said priority dates from the first day of July, A. D. 1883.

[fol. 2716] No. 14—The Jimmy Creek Ditch

That ditch numbered Fourteen, named the Jimmy Creek Ditch, Daniel Johnson and Coe & Carter claimants, is a ditch constructed and used for the irrigation of two hundred acres of land; it draws its supply of water from Jimmy Creek and from the Big Laramie river, with its upper headgate upon the right bank of said Big Laramie river in the south east quarter of section 20, Town 11 North, Range 76 West, and with its crossing or headgate upon Jimmy Creek in the south east quarter of Section 17 of said Town and Range, and entitled by appropriation to

use of water from said streams to Priority Number Fourteen by construction thereof, and Priority Number Twenty-two, by extension thereof, and thereby to the quantity of water with the numbers and dates of the several priorities of the appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto;

It is hereby adjudged and decreed that there be allowed to flow into said ditch from said Jimmy Creek, for the use and benefit aforesaid, under and by virtue of said appropriation by construction Priority Number Fourteen, five and fifty-two hundredths cubic feet of water per second of time, or so much thereof as may be necessary to irrigate two hundred acres of land, the appropriation of which water took effect on, and said priority dates from the first day of June, A. D. 1884.

And it is further adjudged and decreed that when said amount of water is not to be had in said Jimmy Creek, or it is desirable to fill said ditch from the Big Laramie river instead of from Jimmy Creek, that there be allowed to flow into said ditch from said Big Laramie river, for the use and benefit aforesaid, under and by virtue of said appropriation by extension, Priority Number Twenty-two, the said amount of water, to-wit, five and fifty-two hundredths cubic feet per second of time, or so much as may be necessary to irrigate two hundred acres of land, being a total [fol. 2717] appropriation of water from said Jimmy Creek and Big Laramie river of five and fifty-two hundredths cubic feet per second of time, the last mentioned appropriation taking effect upon and said priority dating from the first day of May, A. D. 1891.

No. 15—The Smiths' Brown Ditch

That ditch numbered Fifteen, named the Smiths' Brown Ditch, Joe H. Smith and James E. Smith claimants, is a ditch constructed and used for the irrigation of one hundred and sixty acres of land; it draws its supply of water from the Big Laramie river with two headgates, one South 25 degrees 50 minutes East 3146 feet, and the other South 2 degrees 50 minutes East 1358 feet from the north east corner of Section 32, Town 11 North, Range 76 West, and entitled by appropriation to use of water from said stream to Priority Number Fifteen, by construction thereof, and

thereby to the quantity of water with the number and date of the priority of the appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream, for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number Fifteen, sixteen and fifty-three hundredths cubic feet of water per second of time, or so much thereof as may be necessary to irrigate one hundred and sixty acres of land, the appropriation of which water took effect on, and said priority dates from the 10th day of June, A. D. 1884.

[fol. 2718] No. 16—The Trollope Creek Ditch

That ditch numbered Sixteen, named the Trollope Creek Ditch, John L. Dagle claimant, is a ditch constructed and used for the irrigation of eighty acres of land; it draws its supply of water from Trollope Creek, a tributary of Jimmy Creek which is a tributary of the Big Laramie river, with headgate upon the right bank of said Trollope Creek in the south west quarter of the south west quarter of Section 23, Town 11 North, Range 76 West, and entitled by appropriation to use of water from said stream to Priority Number Sixteen, by construction thereof, and Priority Number Thirty, by enlargement thereof, and thereby to the quantity of water with the numbers and dates of the priorities of the appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto;

It is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream, for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number Sixteen, six and eighty-nine hundredths cubic feet of water per second of time, or so much thereof as may be necessary to irrigate eighty acres of land, the appropriation of which water took effect on, and said priority dates from the 15th day of June, A. D. 1884.

And further that there be allowed to flow into said ditch from said stream for the use and benefit aforesaid, under and by virtue of said appropriation by enlargement, Priority Number Thirty, additional water to the amount of ten

and eighty-six hundredthc cubic feet per second of time, or so much thereof as may be necessary to irrigate eighty acres of land; the appropriation of which last mentioned water took effect on, and said priority dates from the 29th day of May, A. D. 1896.

[fol. 2719] No. 17—The Homestead Ditch

That ditch numbered Seventeen, named the Homestead Ditch, Victor G. H. Stuart and Alexander Stuart claimants, is a ditch constructed and used for the irrigation of one hundred acres of land; it draws its supply of water from a branch of the McIntyre Creek which is a tributary of the Big Laramie river, with headgate upon the left bank of said branch and situated in the north east quarter of the south east quarter of Section 6, Town 10 North, Range 76 West, North 24 degrees 50 minutes West 1800 feet from the south east corner of said Section 6, and entitled by appropriation to use of water from said stream to Priority Number Seventeen, by construction thereof, and thereby to the quantity of water with the number and date of the priority of the appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream, for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number Seventeen, nine cubic feet of water per second of time, or so much thereof as may be necessary to irrigate one hundred acres of land, the appropriation of which water took effect on, and said priority dates from the 10th day of July, A. D. 1884.

[fol. 2720] No. 18—The Martin Ditch No. 2

That ditch numbered Eighteen, named the Martin Ditch No. 2, F. W. Sherwood claimant, is a ditch constructed and used for the irrigation of six hundred and forty acres of land; it draws its supply of water from the Big Laramie river, with headgate upon the south west quarter of the north east quarter of Section 10, Town 10 North, Range 76 West, South 4 degrees 35 minutes East 1920 feet from the quarter corner to Sections 3 and 10 in said Town and Range, and entitled by appropriation to use of water from

said stream to Priority Number Eighteen, by construction thereof, and thereby to the quantity of water with the number and date of the priority of the appropriation thereof, hereinafter mentioned, for the use aforesaid, and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream, for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number Eighteen fourteen and one half cubic feet of water per second of time, or so much thereof as may be necessary to irrigate six hundred and forty acres of land, the appropriation of which water took effect on, and said priority dates from the 30th day of April, A. D. 1887.

[fol. 2721] No. 19—The Grace Creek Ditch

That ditch numbered Nineteen, named the Grace Creek Ditch, Laona E. Hance claimant, is a ditch constructed and used for the irrigation of eighty acres of land; it draws its supply of water from Grace Creek, a tributary of the Big Laramie river, with headgate upon the left bank of said stream and situated in the north west quarter of the north west quarter of Section 14, Town 11 North, Range 77 West, South 37 degrees 45 minutes East 574 feet from the north west corner of said Section 14, and entitled by appropriation to use of water from said stream to Priority Number Nineteen, by construction thereof, and thereby to the quantity of water with the number and date of the priority of the appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream, for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number Nineteen, three and seven hundredths cubic feet of water per second of time, or so much thereof as may be necessary to irrigate eighty acres of land, the appropriation of which water took effect on, and said priority dates from the first day of April, A. D. 1888.

[fol. 2722] No. 20—The Brown Ditch

That ditch numbered Twenty, named the Brown Ditch, C. C. Forrester claimant, is a ditch constructed and used

for the irrigation of one hundred acres of land; it draws its supply of water from Nun Creek, a tributary of the Big Laramie river, with headgate upon the right bank of said stream and situated in the north west quarter of the north west quarter of Section 36, Town 10 North, Range 76 West, about nine hundred feet south easterly from the north west corner of said section 36, and entitled by appropriation to use of water from said stream to Priority Number Twenty, by construction thereof, and thereby to the quantity of water with the number and date of the priority of the appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream, for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number Twenty, ten cubic feet of water per second of time, or so much thereof as may be necessary to irrigate one hundred acres of land, the appropriation of which water took effect on, and said priority dates from the 31st day of May, A. D. 1890.

[fol. 2723] No. 21—The Lamb Ditch

That ditch numbered Twenty-one, named the Lamb Ditch, Clara N. Smith, claimant, is a ditch constructed and used for the irrigation of one hundred and sixty acres of land; it draws its supply of water from the McIntyre Creek, a tributary of the Big Laramie river, with headgate upon the right bank of said stream and situated North 15 degrees 45 minutes East 2196 feet from the south west corner of Section 5, Town 10 North, Range 76 West, and entitled by appropriation of water from said stream to Priority Number Twenty-one, by construction thereof, and thereby to the quantity of water with the number and date of the priority of the appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream, for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number Twenty-one, three and eighty-eight hundredths cubic feet of water per second of time, or so much thereof as may be necessary to irrigate one hundred and

sixty acres of land, the appropriation of which water took effect on, and said priority dates from the first day of June, A. D. 1890.

[fol. 2724] No. 22—The Laramie River Ditch

That ditch numbered Twenty-two, named the Laramie River Ditch, The Water Supply and Storage Company claimant, is a ditch constructed and used for the irrigation of about 30,000 acres of land and for the filling of claimant's reservoirs Nos. 1, 2, 3, 4, and 5 and Chambers' Lake. Its headgate is located upon the right bank of the West branch of the Big Laramie river, at a point from which the quarter corner to Sections 11 and 14, Town 8 North, Range 76 West, bears North 10 degrees 16 minutes East 2817 feet. The ditch is smallest at its headgate and upper end, where it draws its chief supply of water from said West branch of the Big Laramie river, and it increases in size and capacity from the headgate down to its lower end at Chambers Lake and intercepts and appropriates the waters of Two and a Half Mile Creek, Three Quarter Mile Creek, Half Mile Creek and other small branches crossing the line of the ditch between its headgate and its mouth. The capacity of the ditch at the headgate is two hundred and forty-two cubic feet of water per second of time, and said amount is augmented by the increasing carrying capacity of the ditch toward its lower end and the appropriation of the waters of the intersecting streams along the line of the ditch, as aforesaid, to a total capacity of 400 cubic feet of water per second of time. Said ditch is entitled by construction and appropriation of water to use to Priority Number Twenty-three, for the uses aforesaid and for the benefit of the party or parties lawfully entitled thereto;

It is hereby adjudged and decreed that there be allowed to flow into said ditch, for the uses and benefit aforesaid, under and by virtue of said appropriation by construction, [fol. 2725] Priority Number Twenty-three, two hundred and forty-two cubic feet of water per second of time at its headgate, and also one hundred and fifty-eight cubic feet of water per second of time from the tributaries crossing the line of the ditch, being a total appropriation of 400 cubic feet of water per second of time; the appropriation

of all which water took effect on, and said priority dates from the 7th day of August, A. D. 1891.

And it is further adjudged and decreed that the said The Water Supply & Storage Company, claimant herein, be entitled by reason of the construction and operation of said ditch, and its use in carrying and delivering water for storage purposes for irrigation, to Priority numbered One of this Water District. When not needed by prior appropriators for immediate irrigation, the said Company shall have the right to take and carry and store in its reservoirs Nos. 1, 2, 3, 4, and 5 and in Chambers Lake, water from said West branch of said Big Laramie river and its tributaries to the amount of 500,000,000 cubic feet annually. And said reservoir priority Number One shall take effect on and bear even date with the priority hereinbefore decreed to said the Laramie River Ditch, to-wit, the 7th day of August, A. D. 1891.

No. 23—The Comet Ditch

That ditch numbered Twenty-three, named the Comet Ditch, Victor G. H. Stuart claimant, is a ditch constructed and used for the irrigation of two hundred and eighty acres of land; it draws its supply of water from the McIntyre Creek, a tributary of the Big Laramie river, with headgate upon the left bank of said stream in the north west quarter of the north east quarter of Section 17, Town 10 North, Range 76 West, South 14 degrees 45 minutes East 1288 feet [fol. 2726] from the quarter corner to Sections 8 and 17 in said Town and Range, and entitled by appropriation to use of water from said stream to Priority Number Twenty-four, by construction thereof, and thereby to the quantity of water with the number and date of the priority of the appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream, for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number Twenty-four, seven and four-tenths cubic feet of water per second of time, or so much thereof as may be necessary to irrigate two hundred and eighty acres of land, the appropriation of which water took effect on, and said priority dates from the 7th day of December, A. D. 1892.

No. 24.—The Forrester Ditch

That ditch numbered Twenty-four, named the Forrester Ditch, C. C. Forrester claimant, is a ditch constructed and used for the irrigation of eighty acres of land; it draws its supply of water from Brown Creek, a tributary of the Big Laramie river, with headgate upon the right bank of said stream in the north west quarter of Section 25, Town 10, North, Range 76 West, and entitled by appropriation to use of water from said stream to Priority Number Twenty-five, by construction thereof, and thereby to the quantity of water with the number and date of the priority of the appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream, for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Num- [fol. 2727] ber Twenty-five, seven cubic feet of water per second of time, or so much thereof as may be necessary to irrigate eighty acres of land, the appropriation of which water took effect on, and said priority dates from the 15th day of May, A. D. 1893.

No. 25—The Pache Ditch

That ditch numbered Twenty-five, named the Pache Ditch, August Pache claimant, is a ditch constructed and used for the irrigation of two hundred and twenty acres of land; it draws its supply of water from La Garde Creek, a tributary of the Big Laramie river, with headgate upon the right bank of said stream and situated in the north east quarter of the north west quarter of Section 31, Town 11 North, Range 76 West, South 61 degrees West 1118 feet from the quarter corner to Sections 30 and 31 in said Town and Range, and entitled by appropriation to use of water from said stream to Priority Number Twenty-six, by construction thereof, and thereby to the quantity of water with the number and date of the priority of the appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream, for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number Twenty-six

eighteen and fourteen hundredths cubic feet of water per second of time, or so much thereof as may be necessary to irrigate two hundred and twenty acres of land, the appropriation of which water took effect on, and said priority dates from the 25th day of May, A. D. 1893.

[fol. 2728] No. 26—The Link Ditch No. 1

That ditch numbered Twenty-six, named the Link Ditch No. 1, Mary E. Link claimant, is a ditch constructed and used for the irrigation of two hundred acres of land; it draws its supply of water from the Big Laramie river, with headgate upon the right bank of said stream and situated in the south east quarter of the north east quarter of Section 11, Town 9 North, Range 76 West, about 660 feet North of the center line of said Section eleven, and entitled by appropriation to use of water from said stream to Priority Number Twenty-seven, by construction thereof, and thereby to the quantity of water with the number and date of the priority of the appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream, for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number Twenty-seven, fourteen and twenty-two hundredths cubic feet of water per second of time, or so much thereof as may be necessary to irrigate two hundred acres of land the appropriation of which water took effect on, and said priority dates from the first day of June, A. D. 1894.

[fol. 2729] No. 27—The Lone Tree Ditch

That ditch numbered Twenty-seven, named the Lone Tree Ditch, F. W. Sherwood claimant, is a ditch constructed and used for the irrigation of two hundred acres of land; it draws its supply of water from Lone Tree Creek, a tributary of the Big Laramie river, with headgate upon the right bank of said stream and situated in the south west quarter of Section 11, Town 10 North, Range 76 West, South 51 degrees 10 minutes East 2108 feet from the quarter corner to Sections 10 and 11 in said Town and Range, and entitled by appropriation to use of water from said stream to Priority Number Twenty-eight, by construction thereof,

and thereby to the quantity of water with the number and date of the priority of the appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number Twenty-eight, twenty-five cubic feet of water per second of time, or so much thereof as may be necessary to irrigate two hundred acres of land, the appropriation of which water took effect on, and said priority dates from the 24th day of October, A. D. 1894.

No. 28—The French Woman Ditch (Conditional)

That ditch numbered Twenty-eight, named the French Woman Ditch, is a ditch in process of construction to be used when completed for the irrigation of one hundred and twenty acres of land; no application of water to a beneficial use has yet been made. Its headgate is upon the left bank of the French Woman Creek, a tributary of Jimmy [fol. 2730] Creek which flows into the Big Laramie river, and is situated in the north east quarter of the north west quarter of Section 22, Town 11 North, Range 76 West, North 33 degrees 55 minutes West 6310 feet from the South east corner of said Section 22. If said ditch shall be completed and the water actually appropriated and applied to irrigation within a reasonable time from the commencement of the work thereon, according to the nature of the work of constructing said ditch and in accordance with the plan thereof heretofore given in evidence in this matter, the said ditch will be entitled to a priority numbered Twenty-nine, by construction of the ditch, for seven and fifty-six hundredths cubic feet of water per second of time, or so much thereof as may be necessary to irrigate one hundred and twenty acres of land, the appropriation of which water, in such event, shall take effect on and said priority shall date from the 28th day of May, A. D. 1896.

No. 29—The Slough Creek Ditch

That ditch numbered Twenty-nine, named the Slough Creek Ditch, Charles A. Martin claimant, is a ditch constructed and *for* used for the irrigation of thirty-five acres

of land; it draws its supply of water from Slough Creek, a tributary of Grace Creek which is a tributary of the Big Laramie river, with headgate upon the left bank of said stream and situated in the north west quarter of the south west quarter of Section 2, Town 11 North, Range 77 West, South 14 degrees 5 minutes East 465 feet from the quarter corner to Sections 2 and 3 in said Town and Range, and entitled by appropriation to use of water from said stream to Priority Number Thirty-one, by construction thereof, and thereby to the quantity of water with the number and date [fol. 2731] of the *the* priority of the appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream, for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number Thirty-one, four and eleven hundredths cubic feet of water per second of time, or so much thereof as may be necessary to irrigate thirty-five acres of land, the appropriation of which water took effect on, and said priority dates from the 30th day of May, A. D. 1896.

No. 30—The Link Ditch No. 2

That ditch numbered Thirty, named the Link Ditch No. 2, Wallis A. Link claimant, is a ditch constructed and used for the irrigation of fifty acres of land; it draws its supply of water from a branch of the Big Laramie river, with headgate in the north east quarter of the north west quarter of Section 2, Town 9 North, Range 76 West, and entitled by appropriation to use of water from said stream to Priority Number Thirty-two, by construction thereof, and thereby to the quantity of water with the number and date of the priority of the appropriation thereof, hereinafter mentioned, for the use aforesaid, and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream, for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number Thirty-two, two cubic feet of water per second of time, or so much thereof as may be necessary to irrigate fifty acres of land, the appropriation

of which water took effect on, and said priority dates from the 15th day of June, A. D. 1896.

[fol. 2732] And it is further ordered, adjudged and decreed that all of those said appropriations of water hereby found and adjudged to have been so as aforesaid made from the water of the said Big Laramie river and of its said several tributaries, and numbered in order of priority of time of their severally taking effect, from one to thirty-two inclusive, as above set forth in the several paragraphs of this decree, are to be taken, held and enjoyed for the uses in said paragraphs, severally and respectively, to each said appropriation set forth, and with priority of right in manner and order as aforesaid.

And it is further ordered, adjudged and decreed that the foregoing award and allowance of water to flow into each of said ditches in this decree mentioned and numbered as aforesaid, is subject to and shall be allowed to flow into each such ditches or feeders in accordance with the above mentioned priorities, and that all Water Commissioners and their assistants or other officers whose duty it is or may be to make or cause to be made a distribution of water for irrigation among the several ditches and feeders or reservoirs hereinabove mentioned, shall at all times in making such distribution, observe and maintain the aforesaid order of priority among all said ditches and feeders, and distribute water accordingly.

By the Court.

Jay H. Boughton, Judge.

[fol. 2733] STATE OF COLORADO,
County of Larimer, ss:

I, W. P. Hurley, Clerk of the District Court, of the Eighth Judicial District of the State of Colorado within and for Larimer County, do hereby certify the foregoing to be a true, perfect and complete copy of Findings and Decree "In the Matter of the Adjudication of the Priority of Right to the Use of Water for Irrigation in Water District No. 48, State of Colorado," in Case No. 1247 entered on the 30th day of October, 1896.

In testimony whereof I have hereunto set my hand and affixed the seal of said Court, at my office in Fort Collins, Colorado, this 22nd day of May, A. D. 1933.

W. P. Hurley, Clerk. (Seal.)

STATE OF COLORADO,
County of Larimer, ss:

I, Claude C. Coffin, Judge of the District Court of the Eighth Judicial District of the State of Colorado within and for the County of Larimer, do hereby certify that W. P. Hurley, whose name is subscribed to the foregoing Certificate of Attestation, now is, and was, at the time of signing and sealing the same, Clerk of the District Court of Larimer County aforesaid, and keeper of the Records and seal thereof, duly appointed and qualified to office; that full faith and credit are and of right ought to be given to all his official acts as such in all Courts of Record and elsewhere; and that his said attestation is in due form of law, and by the proper officer.

Given under my hand and seal this 22nd day of May, A. D. 1933.

Claude C. Coffin (Seal).

STATE OF COLORADO,
County of Larimer, ss:

I, W. P. Hurley, Clerk of the District Court of the Eighth Judicial District of the State of Colorado, within and for Larimer County, do hereby certify that ——, —— whose genuine signature is appended to the foregoing certificate, was, at the time of signing the same, Judge of the District Court of Larimer County, of the State of Colorado, duly commissioned and qualified; that full faith and credit are and of right ought to be given to all his official acts as such, in all Courts of Record, and elsewhere.

In testimony whereof, I have hereunto set my hand and affixed the seal of said Court, at my office in ——, Colo., this 22nd day of May, A. D. 1933.

W. P. Hurley, Clerk. (Seal)

[fol. 2734] DEFENDANT'S EXHIBIT G

In the Matter of the Adjudication of Priority of Right to Use of Water for Irrigation in Water District N-. 48, State of Colorado

Findings

The following are the findings of fact and law by the referee upon which the decree to be reported to the Court

will be based in the matter of the Adjudication of priority of right to use of water for irrigation purposes in Water District No. 48, State of Colorado:

Ditches

No. 31—La Garde Ditch No. 1	Priority No. 33
No. 32—Detro Ditch No. 1	Priority No. 34
No. 33—Sand Creek Ditch	Priority No. 35
No. 34—Parker Ditch	Priority No. 36
No. 35—Ben Warren Ditch	Priority No. 37
No. 36—Sand Creek Ditch System	Priority No. 38
No. 37—Spring Creek Ditch No. 1	Priority No. 39
No. 19—Grace Creek Ditch (enlarg)	Priority No. 40
No. 38—Seepage Ditch No. 2	Priority No. 41
No. 39—Spring Creek Ditch No. 2	Priority No. 42
No. 35—Ben Warren Ditch (enlarg.)	Priority No. 43
No. 40—Brown Ditch	Priority No. 44
No. 41—Springer Ditch	Priority No. 45
No. 42—Davy Ditch	Priority No. 46
No. 43—Cabin Ditch	Priority No. 47
No. 44—Chas. E. Lanning Ditch	Priority No. 48
No. 45—Forrester Creek Ditch	Priority No. 49
No. 46—Homestead Ditch No. 1	Priority No. 50
No. 47—Homestead Ditch No. 2	Priority No. 51
No. 48—Ferguson Ditch	Priority No. 52
No. 21—Lamb Ditch (enlarg.)	Priority No. 53
No. 49—Forrester Creek Ditch No. 2	Priority No. 54
No. 50—Talmage Ditch No. 1	Priority No. 55
No. 51—Long Park Ditch No. 2	Priority No. 56
No. 52—Nun Creek Ditch	Priority No. 57
No. 53—Lanning & Springer Ditch	Priority No. 58
No. 54—Long Park Ditch	Priority No. 59

Reservoir

No. 2—Porter Lake	Priority No. 2

The ditches in said district are named and numbered as above, (except the Lamb Ditch No. 21 and the Grace Creek Ditch No. 19, which were named and numbered by a former decree) and placed in the order of their priorities as estab- [fol. 2735] lished by the decree rendered herein, likewise the reservoir. The findings of the referee in respect to the ownership, location, size, date and amount of the several

appropriations and the amount of land irrigated, are in respect to each of said several ditches and said reservoir, respectively as follows:

No. 31—LaGarde Ditch No. 1

The ditch is owned by Harry Tatham and William Tatham. The headgate is located at a point on the right bank of LaGarde creek from whence it draws its supply of water, whence the west quarter section corner of section No. 29, township 11, N. Range 76 West, bears S. 10 degrees 45′ E. 1005 feet.

It is one foot deep, 5 feet wide at the top, 3 feet wide at the bottom; its grade is 5 feet per thousand feet and its length is 4,600 feet; its carrying capacity is 15.4 cubic feet per second of time and is used to irrigate 106 acres of land.

The ditch was built during the month of June, 1880 and was begun on June 1st, 1880. On October 30, 1896, a final decree was rendered in Water District No. 48 by the District Court of Larimer County and that more than four years has lapsed since the rendering of said decree. That a right of appropriation for the LaGarde Ditch No. 1, dated June 1st, 1880, would be adverse to the right of all parties whose rights of priority were established by said decree, as bearing date subsequent to June 1st, 1880, and prior to June 15th, 1896; that the Priority by construction for LaGarde Ditch No. 1 should be numbered 33 and bear date, June 16th, 1896, for 15.4 cubic feet of water per second of time.

[fol. 2736] No. 32—Detro Ditch No. 1

The ditch is owned by J. H. Detro.

The headgate is located at a point on the left bank of Forrester creek from whence it draws its water supply, whence the southeast corner of section 12, township 11, N. R. 77 W., bears S. 35 degrees 50′ W. 1320 feet. Its general course is North-westerly.

It is 15 inches deep, 2.5 feet wide of top and 1.5 feet wide at the bottom; its grade is 46.7 feet to the mile, and its capacity is 9 cubic feet per second of time and it irrigates 28 acres of land. Claimant asks for a decree for 5 cubic feet per second of time.

The ditch was built in the month of June, 1882, and water was run in the ditch for irrigation purposes on June 12th, 1882. I further find that a final decree was rendered in Water District No. 48, by the District Court of Larimer County, Colorado, on October the 30th, 1896, and that more than four years has lapsed since the rendering of said decree; that a decree for appropriation for the Detro Ditch No. 1, dated June 12, 1882, would be adverse to the interests of all parties whose rights of priority were established by said decree, as bearing date subsequent to June 12th, 1882, and prior to June 15th, 1896, said last named date being the date of latest appropriation established by said decree; that the Priority, by construction for Detro Ditch No. 1, should be numbered 34, for 5 cubic feet of water per second of time and bear date, June 17th, 1896.

[fol. 2737] No. 33—Sand Creek Ditch

The ditch is owned by August Wurl.

The headgate is located on the left bank of Sand Creek, from which it draws its supply of water at a point whence the south quarter section corner of section 10, T. 11, N. R. 75 W., bears south 60 degrees 10′ west 1880 feet.

Work on the ditch was begun on September 1st, 1886, and it was completed about the first of July, 1888.

The ditch is 9 feet wide on the top and 7 feet wide on the bottom; 18 inches deep and its grade is 12 feet to the mile and it is 14,000 feet long. It irrigates 281 acres of land.

I further find that a final decree was rendered in Water District No. 48 by the District Court of Larimer County, Colo., on October 30th, 1896, and that more than four years has lapsed since the rendering of said decree; that a decree for appropriation of water for the Sand Creek Ditch, dated September 1st, 1886, would be adverse to the interests of all parties whose rights of priority were established by said decree, as bearing date subsequent to September 1st, 1886, and prior to June 15th, 1896, said last named date being the date of the latest appropriation established by said decree; that the priority, by construction, for Sand Creek Ditch should be numbered 35 and bear date June 18th, 1896, for 29 cubic feet of water per second of time.

[fol. 2738] No. 34—Parker Ditch

Parker Ditch is owned by Thos. H. Davy and A. deV. Baldwin.

Its headgate is located at a point whence the S.E. quarter of N.E. quarter corner section 26, T. 10, N. R. 76 W., bears northeasterly 300 feet.

It is five — wide at the bottom and six feet wide at high water line; 18 inches deep and its grade is 7⅓ feet to the mile and its carrying capacity is 14.1 cubic feet per second of time. It is used to irrigate 160 acres of land.

It is entitled to Priority No. 36, by construction, for 14.1 cubic feet of water per second, bearing date October 10th, 1896.

[fol. 2739] No. 35—Ben Warren Ditch

The ditch is owned by Thos. H. Davy. The headgate is located on the north bank of a branch of the Big Laramie river at a point in the northwest quarter of the southwest quarter of section 25, T. 9, N. R. 76 W.

As originally constructed the ditch was four feet wide at high water line, three feet wide at the bottom and one foot deep and had a carrying capacity of 4.22 cubic feet of water per second of time and was built to irrigate one hundred acres of land. The original construction of the ditch was begun on July 15, 1897.

On July 15, 1900, the ditch was enlarged, increasing its capacity 3.28 cubic feet per second by making it one foot wider at the bottom and two feet wider at high water line.

It is entitled to Priority No. 37, by construction, for 4.22 cubic feet of water per second of time, bearing date, July 15th, 1897.

It is entitled to a further Priority No. 43 by enlargement for 3.28 cubic feet of water per second of time bearing date, July 15, 1900.

[fol. 2740] No. 36—Sand Creek Ditch System

It is owned by the Divide Canal and Reservoir Company.

It includes Columbine Ditch, Dead Man Ditch, and Sand Creek Proper. Columbine Ditch has a capacity of 40 cubic feet of water per second which it at present discharges into

the North Fork of the Poudre river. Dead Man ditch has a capacity of 117 cubic feet per second of time which it discharges into the head of Sand Creek. These waters, after being thus discharged into Sand Creek run naturally down that stream, cutting through several natural reservoirs, to a point 83 degrees 45′ east 560 feet from the south quarter corner of section 22, township 11 N., R. 67 (?) where it is taken, with other waters of Sand Creek by means of a ditch of 288 cubic feet capacity and discharged into Sheep Creek, a branch of the North Fork of the Cache laPoudre river, at a point 10 degrees 25′ east 500 feet from the north quarter corner of section 23. Columbine ditch commences at one of the branches of Columbine stream, cuts two other small branches and carries the water into the Poudre river. The Dead Man ditch cuts the main branch of Dead Man Creek and two other branches of the same creek. The system includes an uncompleted ditch connecting Columbine ditch and Dead Man ditch for the purpose of discharging all of the waters of the system of ditches combined in the one ditch, into the Poudre river at the same point and through Sand Creek and Sheep creek.

The amount of land to be irrigated is 50,000 acres.

The Sand Creek Ditch System is entitled to Priority Number 38, by construction, for 288 cubic feet of water per second of time, bearing date, June 15, 1899.

[fol. 2741] No. 37—Spring Creek Ditch No. 1

The ditch is owned by August Wurl.

Its headgate is located on the left bank of Spring creek from whence it draws its water supply, at a point whence the south-west quarter corner section 26, T. 12, N. R. 75 W., bears S. 64 degrees W. 1941 feet.

It is 2½ feet wide on the top, 2 feet on the bottom and one foot deep; 6,300 feet long and has a grade of 5.28 feet per mile and carrying capacity of 2.7 cubic feet per second of time. It irrigates 69 acres of land.

It is entitled to Priority No. 39, for 2.7 cubic feet of water per second of time, bearing date April 15th, 1900.

No. 19—Grace Creek Ditch

The ditch is owned by Ernest W. Johnson.

Headgate is on the left bank of Grace creek, at a point whence the north-west quarter corner of section 14, T. 11,

N. R. 77 W., bears S. 37 degrees 45′ E. 574 feet.

The ditch is 5 feet wide on the top and 4 feet wide on the bottom and its carrying capacity, as enlarged, is 10 cubic feet per second of time.

In the fall of 1899 and spring of 1900 the ditch was enlarged by making it 2 feet wider at the top and 1 foot wider at the bottom, which added to the capacity of the ditch 6.3 cubic feet per second of time; its original capacity was 3.7 cubic feet. The first appropriation of water by the enlargement was on April 28, 1900. It irrigates about 230 acres of land by reason of the enlargement.

It is entitled to Priority No. 40 by enlargement, for 6.3 cubic feet or water per second of time, to bear date April 28th, 1900.

[fol. 2742] No. 38—Seepage Ditch No. 2

The ditch is owned by August Wurl.

Its headgate is located on the left bank of Spring Gulch, from which it draws its supply of water, whence the S. quarter section corner, section 35, T. 12, N. R. 75 W., bears S. 11 degrees W. 1386 feet.

It is 5 feet wide at the top and 4 feet wide at the bottom and one foot deep; its length is 18,000 feet, its grade 5.28 feet per mile and its carrying capacity 5.85 cubic feet per second of time. It irrigates 621 acres of land.

It is entitled to Priority No. 41, by construction, for 5.85 cubic feet of water per second of time, bearing date, May 1st, 1900.

No. 39—Spring Creek Ditch No. 2

The ditch is owned by August Wurl.

Its headgate is located on the left bank of Spring creek, from which it draws its supply of water at a point whence the S. quarter section corner of Sec. 23, T. 12, N. R. 75 W., bears S. 22 degrees W. 853 feet.

It is three feet wide at the top and two feet wide at the bottom and 18 inches deep; it is 5,800 feet long, has a grade of 6 feet per mile and its carrying capacity is 6.6 cubic feet per second of time. It irrigates 76 acres of land.

It is entitled to Priority No. 42, by construction for 6.6 cubic feet of water per second of time, bearing date, May 2nd, 1900.

[fol. 2743] No. 40—Brown Ditch

The ditch is owned by James R. Fortune. It is used to irrigate 160 acres of land. It takes its water from Porter creek, a tributary of the Big Laramie River. The headgate is located at a point whence the northwest corner of section 24, T. 9, N. R. 76 W., bears N. 64 degrees and 26′ W. 1695.1 feet.

It is 2233 feet long, 3 feet wide at the bottom and four feet wide at the top and 18 inches deep; has a grade of 35.9 feet to the mile and a carrying capacity of 15.9 cubic feet per second of time. Work was commenced on the ditch in June 1896, statement filed as platted September 10th, 1900, from which date priority of appropriation is prayed for.

It is entitled to Priority No. 44 by construction for 15.9 cubic feet of water per second of time bearing date Sept. 10th, 1900.

[fol. 2744] No. 41—Springer Ditch

It is owned by Thomas H. Davy and E. E. Springer.

The headgate is located on the south-east quarter of section 36, township 9, North Range 76 W.

It — four feet wide at the bottom, six feet wide at the top and 18 inches deep; thre--fourths of a mile in length, its grade *l*s 12 feet to the mile and its carrying capacity 8 cubic feet per second of time. It irrigates 130 to 140 acres of land.

It is entitled to Priority No. 45, by construction, for 8 cubic feet of water per second of time, bearing date September 11th, 1900.

No. 42—Davy Ditch

The ditch is owned by Thomas H. Davy.

Its headgate is located on the north bank of Dead Man creek from whence it draws its supply of water, at a point whence the south-east corner of section 36, T. 10, N. R. 76 W., bears S. 46 degrees 24′ E. 958.8 feet.

The ditch is five feet wide on the bottom and six feet wide at high water line; its depth is 18 inches; its length 2½ miles, its grade 15.8 feet per mile and its carrying capacity 20 cubic feet per second of time. It irrigates from 300 to 325 acres of land.

It is entitled to Priority No. 46, by construction, for 20 cubic feet of water per second of time, bearing date September 15th, 1900.

[fol. 2745] No. 43—The Cabin Ditch

The ditch is owned by Thomas H. Davy.

Its headgate is located 65 rods west and 16½ rods south from the north-west corner of section 36, T. 10, N. R. 76 W.

It is four feet wide on the bottom, five feet wide on top, one foot deep, has a grade of 15 feet to the mile and carries 7.94 cubic feet of water per second of time. Its capacity is 7.94 cubic feet of water per second of time and it irrigates about 100 acres of land.

It is entitled to Priority No. 47, by construction for 7.94 cubic feet of water per second of time, bearing date, September 16th, 1900.

No. 44—Charles E. Lanning Ditch

The ditch is owned by Charles E. Lanning.

Its headgate is located at a point whence the north-west corner of section 7, T. 8, N. R. 75 W., bears north 40 degrees W. 1355 feet.

It — five feet wide on the bottom, six feet wide on the top and two feet deep; it is 7065 feet long, has grade of 10.50 per mile and its capacity is 15 cubic feet per second of time. It irrigates about 300 acres of land.

It is entitled to Priority No. 48, by construction, for 15 cubic feet of water per second of time, bearing date, June 1st, 1901.

[fol. 2746] No. 45—Forrester Creek Ditch

The ditch is owned by Ernest W. Johnson.

Its headgate is located on the west bank of Forrester creek in the south-east quarter of section 13, T. 11, N. R. 77 W.

It is four feet wide, one foot deep with a grade of 5 feet to the mile and has a carrying capacity of 3.8 cubic feet per second of time. It irrigates 160 acres of land.

It is entitled to Priority, No. 49, by construction, for 3.8 cubic feet of water per second of time, bearing date June 30th, 1901.

No. 46—Homestead Ditch No. 1

It is owned by the estate of August Pache, deceased.

The headgate of the ditch is located on the south bank of Big Jenkins creek from which it draws its supply of water at a point whence the north-east corner of section 25, T. 11, N. R. 77 W., bears N. 60 degrees E. 3343 feet.

It is five — wide on the top, three feet wide on the bottom and two feet deep; its grade is 8 feet to the mile, its length one-half mile and its carrying capacity 5 cubic feet per second of time. It irrigates 80 acres of land.

It is entitled to Priority No. 50, by construction, for 5 cubic feet of water per second of time, bearing date October 22nd, 1901.

[fol. 2747] No. 47—Homestead Ditch No. 2

It is owned by the estate of August Pache, deceased.

The headgate is located on the north bank of Little Jenkins creek, from which it draws its supply of water, at a point whence the south east corner of section 25, T. 11, N. R. 77 W., bears east 2508 feet.

The ditch is three feet wide on top and 1½ feet wide on the bottom; its depth is 15 inches and its grade 8 feet to the mile. Its carrying capacity is 8 cubic feet per second of time. Its length is one half mile. It irrigates 50 acres of land.

It is entitled to Priority No. 51, by construction, for 8 cubic feet of water per second of time, bearing date October 23rd, 1901.

No. 48—Ferguson Ditch

The ditch is owned by Tamerlane Forrester

Its headgate is located at a point whence the south-quarter section corner of section 7, T. 11, N. R. 76 W., bears south 82 degrees 30′ W. 837 feet, on the right bank of the Larimie river.

It is 2½ feet wide at the bottom and 3½ feet wide at the top and 15 inches deep; its length is 3660 with a grade of .6 foot per thousand feet and its capacity is 5 cubic feet per second of time. It irrigates 21 acres of land.

It is entitled to Priority No. 52, by construction, for 5 cubic feet of water per second of time, bearing date December 31st, 1901.

[fol. 2748] No. 21—Lamb Ditch

The ditch is owned by E. M. Pollock and H. W. Pollock.

The ditch, as enlarged is 8 feet wide on the bottom and ten feet wide on the top, 18 inches deep and has a carrying capacity of 18.88 cubic feet per second of time. In May, 1902, the ditch was made four feet wider at the bottom and five feet wider at the top and six inches deeper and its length extended one half mile. By the enlargement 15 cubic feet per second was added to its capacity. As enlarged and extended the ditch will irrigate about 400 acres of land.

No change was made in the location of the headgate by the enlargement and extention.

It is entitled to Priority No. 53, by enlargement and extension, for 15 cubic feet of water per second of time, bearing date May 28th, 1902.

No. 49—The Forrester Ditch No. 2

The ditch is owned by Tamerlane Forrester.

The headgate is located on the right bank of Forrester creek at a point in the N. E. quarter of the N. E. quarter, section 13, T. 11, N. R. 77 W., whence the S. W. corner section 7, T. 11, N. R. 77 W., bears S. 17 degrees 30′ W. 990 feet.

It is 3½ feet wide on top and 3 feet wide on the bottom; 18 inches deep, ½ mile long and its grade is 6 feet to the mile and its carrying capacity four cubic feet per second of time. It irrigates 35 acres of land.

It is entitled to Priority No. 54, by construction, for four cubic feet of water per second of time, bearing date May 30th, 1902.

[fol. 2749] No. 50—Talmage Ditch No. 1

The ditch is owned by C. E. Talmage.

Its headgate is located at a point about 1311 feet southwest from the north-east corner of the northeast quarter of the south-east quarter of section 29, T. 10, N. R. 76 W. It takes its supply of water from McIntyre creek.

It is three feet wide on the top and two feet wide on the bottom; one foot deep and about four hundred yards long; its grade is 26 feet to the mile and its carrying capacity 8 cubic feet per second of time. It irrigates 100 acres of land.

It is entitled to Priority No. 55, by construction, for 8 cubic feet of water per second of time, bearing date, May 31st 1902.

No. 51—Long Park Ditch No. 2

The ditch is owned by John Harris and Charley Shipp.

The headgate is located on the Tight bank of the Laramie river from which it draws its supply of water, at a point about 100 yards west of the quarter corner of section 14, T. 9, N. R. 76 W. Propose to irrigate 200 acres from the ditch which amount is well covered by the ditch.

The ditch is 1½ miles long; three feet wide at the top and 18 inches wide at the bottom; it is two feet deep and has a grade of thirteen feet to the mile and will carry ten cubic feet of water per second of time.

It is entitled to Priority No. 56, by construction, for ten cubic feet of water per second of time, bearing date, June 1st, 1902.

[fol. 2750] No. 52—Nun Creek Ditch

The ditch is owned by Wallie M. Fortune. The headgate is located at a point whence the west quarter corner of section 18, township 9, N. R. 75 W., bears S. 65 degrees 15' W' 3220 feet.

It is 750 feet long and has a grade of 20 feet to the mile; 2 feet wide at bottom four feet at top and 18 inches deep, carrying capacity five cubic feet per second of time. Work was commenced on the ditch on the 8th day of July 1902 and it was completed on the 20th day of July 1902. It takes its water from Nun Creek which is a tributary of Laramie river.

It is entitled to Priority Number 57 by construction for five cubic feet of water per second of time, bearing date July 8th, 1902.

[fol. 2751] No. 53—Lanning and Springer Ditch

The ditch is owned by Stephen Lanning and Eli E. Springer.

The headgate is located in the north bank of Winnifred creek at a point whence the north-east corner section 1, T. 8, N. R. 76 W., bears S. 60 degrees east 1570 feet.

The ditch also cuts Rapid creek one fourth mile distant from its headgate on Winnifred creek from which stream it is also supplied with water. The water of both streams is necessary to supply the ditch. The ditch irrigates 240 acres of land.

The ditch is four feet wide at the top and three feet wide at the bottom and is 18 inches deep; it is 6,200 feet long and has a grade of 25 feet to the mile. Its capacity is 20 cubic feet per second of time—ten cubic feet is claimed.

It is entitled to a Priority No. 58, by construction, for 10 cubic feet of water per second of time, bearing date July 9th, 1902.

[fol. 2752] No. 54—Long Park Ditch

The ditch is owned by James R. Fortune. Wallie M. Fortune, Charles E. Lanning and John McNabb. The headgate is located on the North bank of the Laramie river, from whence it draws it- supply of water at a point whence the S. E. corner of the S. W. quarter of section 24, T. 9, N. R. 76 W., bears N. 29 degrees 15′ E. 475 feet.

The ditch is two miles long, three feet wide at the bottom and five feet wide at the top, two feet deep. Its grade is ten ½ feet to the mile and its carrying capacity ten cubic feet of water per second of time. The ditch was surveyed July 8th 1902 and completed in June, 1905.

It is entitled to priority number 59 for ten cubic feet of water per second of time bearing date July 10th, 1902.

[fol. 2753] Reservoir Findings

No. 2—Porter Lake Reservoir

This reservoir is owned by James R. Fortune and is located on the north-east quarter of the south-east quarter and south-east quarter of the north-east quarter of section 24 T. 9. N. R. 76 W. and has an area of 23.01 acres at its upper contour; and 8.25 at its low water line and water can be stored and drawn off to a depth of 15 feet and has a capacity for storage of 10,140,425 cubic feet; it receives its supply of water from Porter creek, a tributary of the Big Laramie river, through the Porter creek ditch which has a carrying capacity of 10 cubic feet per second of time; the reservoir has been used to irrigate 200 acres of land.

Said reservoir is entitled by original construction, to Priority Number 2, bearing date September 10th, 1902.

The above and foregoing findings upon the twenty-five ditches and one reservoir, concerning which testimony has been offered in this matter and upon which the decree is based, constitute all the special findings of the referee in this proceeding.

J. Mack Mills, Referee.

[fols. 2754 & 2755] IN THE DISTRICT COURT

STATE OF COLORADO,
County of Larimer, ss:

In the Matter of the Adjudication of the Priority of Right to the Use of Water for Irrigation in Water District No. 48, State of Colorado

Decree

Now on this 11th day of October, A. D. 1908, this matter coming on for final hearing and adjudication upon the report of J. Mack Mills, referee appointed herein, to whom this matter was, by order of this Court, herein entered on the 3rd day of February, A. D. 1906, referred for the purposes in said order mentioned, as well upon the several findings upon the evidence produced in this matter, as upon the said evidence taken by and before said referee, and the Court being satisfied, from the several returns of notices, certificates of publication, affidavits and certificates of said referee, respectively, that the said testimony returned, and upon which the findings herein returned have severally been made, was taken upon due and lawful notice, in all respects according to the provisions of the statute in such case made and provided and the rules and several orders of this Court in that behalf in this matter made and entered; and further that the notice of the time set for filing exceptions in this matter to the report and findings, and of the time set for final hearing thereof and this cause, have been duly served on all the parties entitled to notice under the order of this Court in that behalf entered, in manner and form as by said order required; and further, that all interested in this matter and entitled to notice in any stage [fol. 2756] of the proceedings herein, have at all times been duly notified according to law and order of this Court; and the report of the said referee, together with the returns of

service of notices, affidavits, abstract and findings, being found in due form, and the Court having now here in open Court heard all parties and their attorneys so far as they desired to be heard, respectively, touching the several matters herein, it is by the Court, in consideration of the premises, hereby ordered and adjudged that the several findings of the said referee, as reported to and filed in this Court, be in all things approved and confirmed, and that they be taken, deemed and held in all respects as the findings of this Court in this matter; (and further, it is upon like consideration by the Court here ordered, adjudged and decreed in respect to all and singular the said findings of said referee, in respect to each ditch, canal and reservoir in said findings numbered 19, 21, and 31 to 54 inclusive and Reservoir No. 2 as found in Book numbered 11, and as the same are hereinafter mentioned and designated in separate paragraphs hereof as hereinafter in said several paragraphs severally set forth;) subject, however, to the following next mentioned provisions, to-wit:

1. No part of this decree shall in any case be taken, deemed or held to confirm, impair or in any manner effect any claim of right or property held or claimed by any person, or any part thereof, or the land or any part thereof on which any such ditch, canal or reservoir may be situated, or the land held or claimed as a right of way of any of them, or any right, interest or claim of property whatever, in or relating to any of them.

2. No part of this decree shall be taken, deemed or held as affecting in any manner any question or claim of right [fol. 2757] between the owners or claimants of any such ditch, canal or reservoir, as between each other, whether as part owners or shareholders therein, or as stockholders in any corporation or joint stock company claiming or to claim the same or any part thereof, nor shall it affect the rights, interests or claims of any consumers of water for irrigation or domestic purposes, whether as part owner, lessee, shareholder or stockholder in any corporation holding or controlling the same, or as purchasers or water therefrom, as against the rights, interests or claims of any other party or parties interested or claiming interest or rights in or to such ditch, canal or reservoir as owner, lessee or part owner thereof, or as shareholder or stockholder in any cor-

poration claiming the same or as purchaser of water therefrom. Neither shall it affect any claim or priority made or resisted as between parties using water for said purposes from the same ditch, canal or reservoir, as to such water.

3. No part of this decree shall in any manner affect any question between two or more parties claiming or owning priorities as herein adjudged, on the same stream, in any case where the water in such stream sinks and rises to the surface again between the locations of the headgates of their respective ditches or canals, or in any dispute as to the identity of the water appropriated by either party *our* of such sinking and rising stream.

4. This decree shall not effect any question of priority between claimants or owners of ditches or canals used in whole or in part for milling or manufacturing or water power for other purposes as to any water carried in such ditches or canals for said purposes.

5. This decree shall not affect any claim, interest or right of any corporation as to the right of property in any ditch, canal or reservoir, or the ground on which the same may be situated, or any question which may arise between the stockholders thereof or between them and the State, people [fol. 2758] or any party, upon the dissolution of such corporation by expiration of its charter or otherwise, as to any appropriation of water or rights secured by condemnation proceeding by such corporation during its legal existence.

6. No part of this decree shall affect in any way any right, claim or interest now or hereafter held or claimed to any appropriation of water made after the closing of the testimony touching the construction or enlargements of the ditch, canal or reservoir by means of which such appropriation may have been made.

7. No part of this decree shall be taken, deemed or held as adjudging to any claimant or present or future representative of any claim to any ditch or canal or reservoir, or party holding, using or controlling the same, any right to take and carry by means of any ditch, canal or reservoir herein mentioned, or by virtue of any appropriation herein adjudged, any water from any natural stream except to be applied to the use for which such appropriation has been

made; nor to allow any excessive use or waste of water whatever; nor to allow any diversion of water except for lawful and beneficial uses.

8. This decree shall be taken, deemed and held as intended to determine and establish the several priorities of right by appropriation of water from the streams of said Water District No. 48, for irrigation, of the several ditches, canals and reservoirs in said district, concerning which testimony has been offered in this matter, each according to the construction, enlargement or extension thereof, with the amount of water held to have been appropriated thereby.

Subject to the several last mentioned eight provisions it [fol. 2759] is further, as to said ditches, canals and reservoirs, and the several appropriations of water by means of them respectively claimed in this matter, ordered, adjudged and decreed, as in and by the findings of said referee is found, as follows:—

That said ditches be and the same are hereby numbered according to the date of their several and respective constructions, and said dates are hereby determined and declared to be as follows:

Ditch number	Name of ditch	Date appropriation	Priority number
31	LaGarde Ditch No. 1	June 16, 1896	33.
32	Detro Ditch No. 1	June 17, 1896	34.
33	Sand Creek Ditch	June 18, 1896	35.
34	Parker Ditch	Oct. 10, 1896	36.
35	Ben Warren Ditch	July 15, 1897	37.
36	Sand Creek Ditch System	June 15, 1899	38.
37	Spring Creek Ditch No. 1	Apr. 15, 1900	39.
19	Grace Creek Ditch (enlarg.)	Apr. 28, 1900	40.
38	Seepage Ditch No. 2	May 1, 1900	41.
39	Spring Creek Ditch No. 2	May 2, 1900	42.
35	Ben Warren Ditch (enlarg.)	July 15, 1900	43.
40	Brown Ditch	Sept. 10, 1900	44.
41	Springer Ditch	Sept. 11, 1900	45.
42	Davy Ditch	Sept. 15, 1900	46.
43	Cabin Ditch	Sept. 16, 1900	47.
44	Chas. E. Lanning Ditch	June 1, 1901	48.
45	Forrester Creek Ditch	June 30, 1901	49.
46	Homestead Ditch No. 1	Oct. 22, 1901	50.
47	Homestead Ditch No. 2	Oct. 23, 1901	51.
48	Ferguson Ditch	Dec. 31, 1901	52.
21	Lamb Ditch (enlarg.)	May 28, 1902	53.
49	Forrester Creek Ditch No. 2	May 30, 1902	54.
[fol. 2760]			
50	Talmage Ditch No. 1	May 31, 1902	55.
51	Long Park Ditch No. 2	June 1, 1902	56.
52	Nun Creek Ditch	July 8, 1902	57.
53	Lanning & Springer Ditch	July 9, 1902	58.
54	Long Park Ditch	July 10, 1902	59.
	Reservoir		
2	Porter Lake	Sept. 10, 1902	2.

[fol. 2761] No. 31—LaGarde Ditch No. 1

That ditch numbered 31, named the LaGarde Ditch No. 1, Harry Tatham and William Tatham claimants, is a ditch constructed and used for the irrigation of 106 acres of land; it draws its supply of water from LaGarde creek with its headgate upon the right bank of said stream at a point whence the west quarter section corner of section 29, township 11, North, Range 76 West, bears S. 10 degrees 45′ E. 1005 feet, and entitled by appropriation to use of water from said stream to Priority Number 33 by construction thereof and thereby to the quantity of water with the number and date of the priority of appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream for the use and benefit aforesaid under and by virtue of said appropriation by construction, Priority Number 33, fifteen and four tenths cubic feet of water per second of time, or so much thereof as may be necessary to irrigate one hundred and six acres of land, the appropriation of which water took effect on, and said priority dates from the 16th day of June, A. D. 1896.

[fol. 2762] No. 32—Detro Ditch No. 1

That ditch numbered thirty-two, named Detro Ditch No. 1, J. H. Detro, claimant, is a ditch constructed and used to irrigate twenty-eight acres of land. It draws its supply of water from Forrester creek with its headgate on the left bank of said stream at a point whence the south-east corner of section twelve, township eleven, North, Range 77 W., bears S. 35 degrees and 50′ W. 1320 feet, and entitled by appropriation to use of water from said stream to Priority Number thirty-four, by construction thereof, and thereby to the quantity of water with the number and date of priority of appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream, for the use and benefit aforesaid under and by virtue of said appropriation by construction, Priority Number thirty-four, five cubic feet of water per

second of time, or so much thereof as may be necessary to irrigate twenty eight acres of land, the appropriation of which water took effect on, and said priority dates from the 17th day of June, A. D. 1896.

[fol. 2763] No. 33—Sand Creek Ditch (Modified Decree)

That ditch numbered thirty-three, named the Sand Creek Ditch, August Wurl, claimant, is a ditch constructed and used to irrigate three hundred and fifty-one acres of land, and to supply Seepage Ditch Number 2, Spring Creek Ditch Number 1 and Spring Creek Ditch Number 2 with water from Sand Creek for the irrigation of lands lying under said ditches; it draws its supply of water from Sand Creek with its headgate located on the left bank of said stream at a point whence the south quarter corner of Section 10, Township 11, N. R. 75 W., bears south 60 degrees, 10 minutes W. 1880 feet, and entitled by appropriation to use of water from said stream to priority Number Thirty-five, by construction thereof, and thereby to the quantity of water, with the number and date of the priority of the appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream, for the use and benefit aforesaid under and by virtue of said appropriation by construction, Priority Numbered Thirty-five, eight and three tenths cubic feet of water per second of time, or so much thereof as may be necessary to irrigate three hundred and fifty-one acres of land, the appropriation of which water took effect on, and said priority dates from the 18th day of June, A. D. 1896.

[fol. 2764] No. 34—Parker Ditch

That ditch numbered 34, named the Parker Ditch, Thomas H. Davy and A. deV. Baldwin, claimants, is a ditch constructed and used to irrigate one hundred and sixty acres of land; it draws its supply of water from the Laramie river with headgate upon the right bank of said stream at a point whence southeast quarter of north-east quarter corner section 26, township 10 North, Range 76 W., bears north-easterly 300 feet, and entitled by appropriation to use water from said stream to Priority Number

thirty-six, by construction thereof, and thereby to the quantity of water with the number and date of the priority of the appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream, for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number thirty-six, fourteen and one-tenth cubic feet of water per second of time, or so much thereof as may be necessary to irrigate one hundred and sixty acres of land, the appropriation of which water took effect on, and said priority dates from the 10th day of October, A. D. 1896.

[fol. 2765] No. 35—Ben Warren Ditch

That ditch numbered 35, named Ben Warren Ditch, Thos. H. Davy, claimant, is a ditch constructed and used to irrigate one hundred acres of land; it draws its supply of water from a branch of the Big Larimer river, with its head gate located on the north bank of said branch at a point in the north-west quarter of the southwest quarter of section 25, T. 9, N. R. 76 W. It is entitled by appropriation to use of water from said stream to Priority No. 37 by construction thereof and thereby to the quantity of water with the number and date of the priority of appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto: It is hereby adjudged and decreed that there be allowe- to flow into said ditch from said stream for the use and benefit aforesaid under and by virtue of said appropriation by construction, Priority Number 37, 4.22 cubic feet of water per second of time, or so much thereof as may be necessary to irrigate one hundred acres of land, the appropriation of which water took effect on, and said priority dates from the 15th day of July, A. D. 1897.

And further that said ditch is entitled by appropriation to use of water from said stream to Priority Number 43 by enlargement thereof and thereby to the quantity of water with the number and date of the priority of appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it — hereby adjudged and decreed that there be allowed to flow into said ditch from said stream for the

use and benefit aforesaid, under and by virtue of said appropriation by enlargement, Priority Number 43, 3.28 cubic feet of water per second of time, or so much thereof as may be necessary to irrigate one hundred acres of land, the appropriation of which water took effect on, and said priority dates from the 15th day of July, A. D. 1900.

[fol. 2766] No. 36—The Sand Creek Ditch System

That ditch numbered thirty-six, named the Sand Creek Ditch System, The Divide Canal and Reservoir Company, claimant, is a ditch constructed and used for the irrigation of fifty thousand acres of land, through the use of the natural channels of Sand Creek, Sheep Creek and the Cache la Poudre River and storage reservoirs belonging to the system; it draws its supply of water from Columbine Creek and its tributaries, from Deadman Creek and its tributaries and from Sand Creek and its tributaries, all of said streams being tributaries of the Laramie River, by means of ditches formerly known as Columbine Ditch, which has its headgate at one of the branches of Columbine Creek and discharges its waters into Deadman ditch, and Deadman ditch which draws its supply of water from Columbine ditch and Deadman Creek and discharges into the head of Sand Creek at a point whence the north-west corner of section 16, is north 7 degrees 25′ west 2100 feet from the north end of Deadman ditch at the point that it empties into Sand Creek, and a ditch connecting Sand Creek with Sheep Creek, with its headgate at a point south 84° 45′ east 560 feet from the south quarter corner of section 22, township 11, North Range 75 W., discharging its waters into Sheep Creek at a point north 10°—25′ east 500 feet from the north quarter corner of section 23, T. 11, N. R. 75 W., which said Sheep Creek is a branch of the Cache la Poudre River into which it discharges all the waters of the system and through which it is carried to distributing ditches and reservoirs; it is entitled by appropriation to use of water from said streams to Priority Number thirty-eight, by construction thereof, and thereby to the quantity of water with the number and date of the priority of the appropriation thereof, [fol. 2767] hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said streams, for the

use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number thirty-eight, two hundred and eighty-eight cubic feet of water per second of time, or so much thereof as may be necessary to irrigate fifty thousand acres of land, the appropriation of which water took effect on and said priority dates from the 15th day of June, A. D. 1899.

[fol. 2768] No. 37—Spring Creek Ditch No. 1 (Modified Decree)

That ditch numbered Thirty-seven, named Spring Creek Ditch No. 1, August Wurl, claimant, is a ditch constructed and used to irrigate 69 acres of land; it draws its supply of water from Sand Creek with its headgate on the left bank of Spring Creek, at a point whence the south-west quarter corner section twenty-six, township 12, N. R. 75 W., bears south 64 degrees W. 1941 feet, which said Spring Creek receives said supply of water from Sand Creek through and by means of Sand Creek Ditch, Number 33, and entitled by appropriation to use of water from Sand Creek to Priority Numbered Thirty-nine, by construction thereof, and thereby to the quantity of water with the number and date of the priority of the appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said Sand Creek Ditch from Sand Creek and through said Sand Creek ditch into the channel of Spring Creek, for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number Thirty-nine, two and seven-tenths cubic feet of water per second of time, or so much thereof as may be necessary to irrigate sixty-nine acres of land, the appropriation of which water took effect on and said priority dates from the 15th day of April, A. D. 1900.

[fol. 2769] No. 38—Seepage Ditch No. 2 (Modified Decree)

That ditch numbered Thirty-seven, named Seepage Ditch No. 2, August Wurl, Claimant, is a ditch constructed and used to irrigate six hundred and twenty-one acres of land; it draws its supply of water from Sand Creek with its headgate located on the left bank of Spring Gulch at a

point whence the south quarter section corner section 35, township 12, North Range 75 W., bears south 11 degrees W. 1386 feet, which said Spring Gulch receives said supply of water from Sand Creek through and by means of Sand Creek Ditch No. 33, and entitled by appropriation to use of water from said Sand Creek to Priority Numbered Forty-one, by construction thereof, and thereby to the quantity of water with the number and date of priority of appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby Adjudged and Decreed there be allowed to flow into Sand Creek Ditch from Sand Creek, and through said Sand Creek ditch into Spring Gulch and into and through said Seepage Ditch No. 2 for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number Forty-one, five and eighty-five one-hundredths cubic feet of water per second of time, or so much thereof as may be necessary to irrigate six hundred and twenty-one acres of land, the appropriation of which water took effect on and said priority dates from the first day of May, A. D. 1900.

[fol. 2770] No. 19—Grace Creek Ditch

That ditch numbered nineteen, Ernest W. Johnson claimant, named Grace Creek Ditch, is a ditch constructed and enlarged to irrigate two hundred and thirty acres of land; it draws its supply of water from Grace Creek with its headgate on the left bank of said stream at a point whence the north-west (quarter) corner of section 14, township 11, North Range 77 W., bears S. 37 degrees 45′ E. 574 feet, and entitled by appropriation to use of water from said stream to Priority Number Forty by enlargement thereof and thereby to the quantity of water with the number and date of the priority of the appropriation by enlargement thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream for the use and benefit aforesaid, under and by virtue of said appropriation by enlargement, Priority Number Forty, six and three tenths cubic feet of water per second of time, or so much thereof as may be necessary to irrigate two hundred and thirty acres of land, the appropriation of which water took effect

on, and said priority dates from the 28th day of April, A. D. 1900.

[fol. 2771] No. 39—Spring Creek Ditch No. 2 (Modified Decree)

That ditch numbered thirty-nine, named Spring Creek Ditch No. 2, August Wurl claimant, is a ditch constructed and used to irrigate 76 acres of land; it draws its supply of water from Sand Creek with its headgate located on the left bank of Spring Creek at a point whence the south quarter section corner of section 23, township 12, N. R. 75 W., bears S. 22 degrees W. 853 feet, which said Spring Creek receives said supply of water from Sand Creek through and by means of Sand Creek Ditch No. 33, and entitled by appropriation to use of water from Sand Creek to priority number forty-two by construction thereof, and thereby to the quantity of water with the number and date of the appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is therefore Adjudged and Decreed that there be allowed to flow into Sand Creek ditch from Sand Creek and through said Sand Creek ditch into the channel of Spring Creek and into and through Spring Creek Ditch No. 2 for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Numbered Forty-two, six and six-tenths cubic feet of water per second of time, or so much thereof as may be necessary to irrigate seventy-five acres of land, the appropriation of which water took effect on, and said priority dates from, the 2nd day of May, A. D. 1900.

[fol. 2772] No. 40—The Brown Ditch

That ditch numbered forty, named the Brown Ditch, James R. Fortune owner, is a ditch which draws its supply of water from Porter Creek, a tributary of the Big Laramie River, and is constructed and used to irrigate one hundred and sixty acres of land, with its headgate located on Porter Creek at a point whence the north-west corner of section twenty-four, township nine North, Range seventy-six west, bears north sixty-four degrees and twenty-six minutes west

one thousand six hundred and ninety-five feet, and entitled by appropriation to use of water from said stream to Priority Number Forty-four by construction thereof, and thereby to the quantity of water with the number and date of the priority of the appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is therefore hereby adjudged and decreed that there be allowed to flow into said ditch from said stream, for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number Forty-four, fifteen and nine-tenths cubic feet of water per second of time, or so much thereof as may be necessary to irrigate one hundred and sixty acres of land, the appropriation of which water took effect on, and said priority dates from the tenth day of September, A. D. 1900.

[fol. 2773] No. 41—Springer Ditch

That ditch numbered forty-one, named the Springer Ditch, Thomas H. Davy and E. E. Springer claimants, is a ditch which draws its supply of water from the Larimie River with its headgate located on the east bank of said river in the south-east quarter of section thirty-nine, township nine North, Range seventy-six west, and is used to irrigate one hundred and forty acres of land, and is entitled by appropriation by construction to use of water from said stream to Priority Number Forty-five, by construction thereof, and thereby to the quantity of water with the number and date of the priority of the appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is therefore hereby adjudged and decreed that there be allowed to flow into said ditch from said stream, for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number Forty-five, eight cubic feet of water per second of time or so much thereof as may be necessary to irrigate one hundred and forty acres of land, the appropriation of which water took effect on and said priority dates from the 11th day of September, A. D. 1900.

[fol. 2774] No. 42—The Davy Ditch

That ditch numbered forty-two, named the Davy Ditch, Thomas H. Davy claimant, is a ditch constructed and used to irrigate three hundred and twenty-five acres of land, with its headgate located on the north bank of Dead Man Creek, from whence it draws its supply of water, at a point whence the south-east corner of section 36, township 10, N. R. 76 W., bears south 46 degrees and 24' E. 958.8 feet and is entitled by appropriation to use of water from said stream to Priority Number Forty-six, by construction thereof, and thereby to the quantity of water with the number and date of the priority of the appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto, it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream, for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number Forty-six, twenty cubic feet of water per second of time, or so much thereof as may be necessary to irrigate three hundred and twenty-five acres of land, the appropriation of which water took effect on and said priority dates from the 15th day of Sept., A. D. 1900.

[fol. 2775] No. 43—The Cabin Ditch

That ditch numbered forty-three named the Cabin Ditch, Thomas H. Davy, claimant, is a ditch constructed and used to irrigate one hundred acres of land; it draws its supply of water from Stub creek with headgate located upon the south bank of said stream at a point sixty-five rods west and sixteen and one-half rods south from the northwest corner of section 36, township 10, N. R. 76 W., and entitled by appropriation to use of water from said stream to Priority Number Forty-seven, by construction thereof, and thereby to the quantity of water with the number and date of the appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream, for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number Forty-seven, seven and ninety-four one-hundredths

cubic feet of water per second of time, or so much thereof as may be necessary to irrigate one hundred acres of land, the appropriation of which water took effect on and said priority dates from the 16th day of September, A. D. 1900.

[fol. 2776] No. 44—Charles E. Lanning Ditch

That ditch numbered forty-four, named the Charles E. Lanning ditch, Charles E. Lanning claimant, is a ditch constructed and used to irrigate three hundred acres of land; it draws its supply of water from the west bank of the Larimer river with headgate located at a point whence the northwest corner of section 7., T. 8, N. R. 75 W., bears north forty degrees west 1355 feet, and entitled by appropriation to use of water from said stream to Priority Number Forty-eight by construction thereof, and thereby to the quantity of water with the number and date of the priority of the appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it — hereby adjudged and decreed that there be allowed to flow into said ditch from said stream, for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number Forty-eight, fifteen cubic feet of water per second of time, or so much thereof as may be necessary to irrigate three hundred acres of land, the appropriation of which water took effect on and said priority dates from the 1st day of June, A. D. 1901.

[fol. 2777] No. 45—Forrester Creek Ditch

That ditch numbered forty-five, named the Forrester Creek Ditch, Ernest W. Johnson, claimant, is a ditch constructed and used to irrigate one hundred and sixty acres of land; it draws its supply of water from Forrester creek, with its headgate upon the west bank of said stream located in the southeast quarter of section 13, township 11 north, Range 77 W., and entitled by appropriation to use of water from said stream to Priority Number Forty-nine, by construction thereof, and thereby to the quantity of water with the number and date of the priority of appropriation thereof, hereinafter mentioned, for the use and benefit aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed

that there be allowed to flow into said ditch from said stream, for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number Forty-nine, three and eight tenths cubic feet of water per second of time, or so much thereof as may be necessary to irrigate one hundred and sixty acres of land, the appropriation of which water took effect on and said priority dates from the 30th day of June, A. D. 1901.

[fol. 2778] No. 46—Homestead Ditch No. 1

That ditch numbered forty-six, named Homestead Ditch No. 1 Abbie Vuagniaux, as widow of August Pache, deceased, claimant, is a ditch constructed and used to irrigate eighty acres of land; it draws its supply of water from Big Jenkins creek with its headgate located on the south bank of said stream at a point whence the northeast corner of section 25, T. 11, N. R. 77 W., bears N. 60 degrees E. 3343 feet, and entitled by appropriation to use of water from said stream to Priority Number Fifty, by construction thereof, and thereby to the quantity of water with the number and date of the priority of the appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream, for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number Fifty, five cubic feet of water per second of time, or so much thereof as may be necessary to irrigate eighty acres of land, the appropriation of which water took effect on and said priority dates from the 22nd day of October, A. D. 1901.

[fol. 2779] No. 47—Homestead Ditch No. 2

That ditch numbered forty-seven, named Homestead Ditch No. 2, Abbie Vuagniaux, as widow of August Pache, deceased, claimant, is a ditch constructed and used to irrigate fifty acres of land; it draws its supply of water from Little Jenkins creek with its headgate on the north bank of said stream at a point whence the southeast corner of section 25, T. 11, N. R. 77 W., bears east 2508 feet, and entitled by appropriation to use of water from said stream to Priority Number Fifty-one, by construction thereof, and

thereby to the quantity of water with the number and date thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream, for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number Fifty-one, eight cubic feet of water per second of time, or so much thereof as may be necessary to irrigate fifty acres of land, the appropriation of which water took effect on and said priority dates from the 23rd day of October, A. D. 1901.

[fol. 2780] No. 48—Ferguson Ditch

That ditch numbered forty-eight, named the Ferguson Ditch, Tamerlane Forrester, claimant, is a ditch constructe- and used to irrigate twenty-one acres of land; it draws its supply of water from the Laramie river with its headgate located on the right bank of said stream at a point whence the south quarter section corner of section seven T. 11, N. R. 76 W., bears S. 82 degrees 30′ W. 837 feet, and entitled by appropriation to use of water from said stream to Priority Number Fifty-two, by construction thereof, and thereby to the quantity of water with the number and date of the priority of the appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream, for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number Fifty-two, five cubic feet of water per second of time, or so much thereof as may be necessary to irrigate twenty-one acres of land, the appropriation of which water took effect on and said priority dates from the 31st day of December, A. D. 1901.

[fol. 2781] No. 21—The Lamb Ditch

That ditch numbered twenty-one, named the Lamb Ditch, H. W. Pollock and E. M. Pollock, claimants, is a ditch constructed and enlarged and used to irrigate four hundred and thirty acres of land; it draws its supply of water from McIntyre creek, a tributary of the Big Laramie river, with headgate upon the right bank of said stream and situated

North 15 degrees and 45′ east 2196 feet from southwest corner of section 5, Township 10 North, Range 76 W., and entitled by appropriation to use of water from said stream to Priority Number Fifty-three, by enlargement thereof and thereby to the quantity of water with the number and date of the priority of the appropriation by enlargement thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the part yor parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream for the use and benefit aforesaid, under and by virtue of said appropriation by enlargement, Priority Number Fifty-three, fifteen cubic feet of water per second of time, or so much thereof as may be necessary to irrigate four hundred and thirty acres of land, the appropriation of which water took effect on and said priority dates from the 28th day of May, A. D. 1902.

[fol. 2782] No. 49—The Forrester Creek Ditch No. 2

That ditch numbered forty-nine, named Forrester creek ditch No. 2, Tammerlane Forrester, claimant, is a ditch constructed to irrigate thirty-five acres of land; it draws its supply of water from Forrester creek with its headgate located on the right bank of said stream at a point whence the southwest corner of section 7, T. 11 N., R. 76 W., bears S. 17 degrees 30′ W. 990 feet, and entitled by appropriation to use of water from said stream to Priority Number Fifty-four, by construction thereof, and thereby to the quantity of water with the number and date of the priority of the appropriation thereof, hereafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream, for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number Fifty-four, four cubic feet of water per second of time, or so much thereof as may be necessary to irrigate thirty-five acres of land, the appropriation of which water took effect on and said priority dates from the 30th day of May, A. D. 1902.

[fol. 2783] No. 50—Talmage Ditch No. 1

That the ditch numbered fifty, named the Talmage Ditch No. 1, C. E. Talmage claimant, is a ditch constructed and

used to irrigate one hundred acr-s of land; it draws its supply of water from McIntyre creek with its headgate located at a point about 1,311 feet from the north-east corner of the northeast of the south-east quarter of section 29, township 10, N. R. 76 W., and about due southwest from said described corner, and entitled by appropriation to the use of water from said stream to Priority Number Fifty-five, by construction thereof, and thereby to the quantity of water and the number and date of the priority of the appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream, for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number Fifty-five, eight cubic feet of water per second of time, or so much thereof as may be necessary to irrigate one hundred acres of land, the appropriation of which water took effect on, and said priority dates from the 31st day of May, A. D. 1902.

[fol. 2784] No. 51—Long Park Ditch No. 2

That ditch numbered fifty-one, named Long Park Ditch No. 2, John Harris and Charley Ship, claimants, is a ditch constructed and used to irrigate two hundred acres of land; it draws its supply of water from the Laramie river with its headgate located on the right bank of said stream at a point about one hundred yards west of the quarter corner of section 14, T. 9, N. R. 76 W., and entitled by appropriation to the use of water from said stream to Priority Number Fifty-six, by construction thereof, and thereby to the quantity of water with the number and date of the priority of appropriation thereof, hereinafter mentioned, for the use and benefit aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream, for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number Fifty-six, ten cubic feet of water per second of time, or so much thereof as may be necessary to irrigate two hundred acres of land, the appropriation of which water took effect on and said priority dates from the 1st day of June, A. D. 1902.

[fol. 2785] No. 52—Nun Creek Ditch

That ditch numbered fifty-two, named Nun Creek Ditch, Wallie M. Fortune, claimant, is a ditch constructed and used to irrigate 160 acres of land; it draws its supply of water from Nun Creek with headgate located at a point whence the west quarter corner of section 18, township 9, N. R. 75 W., bears S. 65 degrees 15' W. 3220 feet, and entitled by appropriation to the use of water from said stream to Priority Number Fifty-seven, by construction thereof, and thereby to the quantity of water with the number and date of the priority of the appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream, for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number Fifty-seven, five cubic feet of water per second of time, or as much thereof as may be necessary to irrigate one hundred and sixty acres of land, the appropriation of which water took effect on, and said priority dates from the 8th day of July, A. D. 1902.

[fol. 2786] No. 53—Lanning and Springer Ditch

That ditch numbered fifty-three, named the Lanning and Springer Ditch, Stephen Lanning and Eli E. Springer, claimants, is a ditch constructed and used to irrigate two hundred and forty acres of land; it draws its supply of water from Winifred Creek and Rapid Creek with its head gate upon the north bank of said stream (Winifred creek) at a point whence the N. E. corner section 1, T. 8 N., R. 76 W., bears S. 60 degrees east 1570, from whence the ditch cuts across Rapid creek, taking the water from said creek, about a quarter mile from said headgate, and is entitled by appropriation to the use of water from said streams to Priority Number Fifty-eight, by construction thereof, and thereby to the quantity of water with the number and date of the priority of appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said streams, for the use and benefit aforesaid, under and by virtue of said appropria-

tion by construction, Priority Number Fifty-eight, ten cubic feet of water per second of time, or so much thereof as may be necessary to irrigate two hundred and forty acres of land, the appropriation of which water took effect on and said priority dates from the 9th day of July, A. D. 1902.

[fol. 2787] No. 54—Long Park Ditch

That ditch numbered fifty-four, named the Long Park Ditch, James R. Fortune, Wallie M. Fortune, Charles E. Lanning and John McNabb, claimants, is a ditch constructed and used to irrigate three hundred and fifty acres of land; it draws its supply of water from the north bank of the Big Laramie river with its headgate located at a point whence the south-east corner of the south-west quarter of section 24, T. 9, N. R. 76 W., bears N. 29 degrees 15' E. 475 feet and is entitled by appropriation to the use of water from said stream to Priority Numbered Fifty-nine, by construction thereof, and thereby to the quantity of water with the number and date of the priority of the appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream, for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number Fifty-nine, ten cubic feet of water per second of time, or so much thereof as may be necessary to irrigate three hundred and fifty acres of land, the appropriation of which water took effect on and said priority dates from the 10th day of July, A. D. 1902.

[fol. 2788] Reservoir Decree

No. 2—Porter Lake Reservoir

That reservoir numbered 2, named Porter Lake, James R. Fortune claimant, is a reservoir constructed to irrigate two hundred acres of land; it is located on the northeast quarter of the southeast quarter and the southeast quarter of the northeast quarter of section 24, township 9, north of Range 76 W. It takes its supply of water from Porter Creek through the Porter Creek Ditch and is entitled to

one appropriation of water for the purpose of filling said reservoir from said stream to Priority Number Two, by construction thereof and thereby entitled to the quantity of water with the number and date of the priority of the appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that the said reservoir be allowed to have stored in it from Porter creek by means of the ditch aforesaid and for the benefit of the party or parties aforesaid under and by virtue of said appropriation by construction Priority No Two so much water as is necessary to fill said reservoir to a depth of fifteen feet above its lower contour with a capacity of 10,140,425 cubic feet of water and an area at its upper contour of 23.01 acres, which appropriation of water for storage purposes took effect on, and dates from the 10th day of September, A. D. 1902.

[fol. 2789] And it is further ordered, adjudged and decreed that all of those said appropriations of water hereby found and adjudged to have been so as aforesaid made from the water of the said Laramie river (or Big Laramie river) and of its said several tributaries, and numbered in order of priority of the time of their severally taking effect, appropriations by enlargement of ditches numbered nineteen and twenty-one and by original construction of priorities numbered from thirty-three to fifty-nine, inclusive, as above set forth and in the several paragraphs of this decree, are to be taken, held and enjoyed for the uses in said paragraphs, severally and respectively, to each said appropriation set forth, and priority of right in manner and order as aforesaid.

And it is further ordered, adjudged and decreed that the foregoing award and allowance of water to flow into each of said ditches in this decree mentioned and numbered as aforesaid, and said reservoir, is subject to and shall be allowed to flow into each of said ditches and feeders in accordance with the above mentioned priorities, and that all Water Commissioners and their assistants or other officers whose duty it is or may be to make or cause to be made a distribution of water for irrigation among the several ditches and feeders of reservoirs, hereinabove mentioned, shall at all times in making such distribution, observe and maintain the aforesaid order of priority among

all said ditches and feeders, and distribute water accordingly.

And it is further ordered that the costs of the Clerk of this court shall be prorated among the several claimants.

By the Court.

James E. Garrigues, Judge.

Dated this 11th day of October, 1906.

[fol. 2790] STATE OF COLORADO,
County of Larimer, ss:

I, W. P. Hurley, Clerk of the District Court, of the Eighth Judicial District of the State of Colorado within and for Larimer County, do hereby certify the foregoing to be a true, perfect and complete copy of Findings and Decree "In the Matter of the Adjudication of Priority of Right to the Use of Water for Irrigation in Water District No. 48, State of Colorado," in Case No. 1885 entered on the 11th day of October, 1906.

In testimony whereof I have hereunto set my hand and affixed the seal of said Court, at my office in Fort Collins, Colorado, this 22nd day of May, A. D. 1933.

W. P. Hurley, Clerk. (Seal.)

STATE OF COLORADO,
County of Larimer, ss:

I, Claude C. Coffin, Judge of the District Court of the Eighth Judicial District of the State of Colorado within and for the County of Larimer, do hereby certify that W. P. Hurley, whose name is subscribed to the foregoing Certificate of Attestation, now is, and was, at the time of signing and sealing the same, Clerk of the District Court of Larimer County aforesaid, and keeper of the Records and seal thereof, duly appointed and qualified to office; that full faith and credit are and of right ought to be given to all his official acts as such in all Courts of Record and elsewhere; and that his said attestation is in due form of law, and by the proper officer.

Given under my hand and seal this 22nd day of May, A. D. 1933.

Claude C. Coffin. (Seal.)

STATE OF COLORADO,
County of Larimer, ss:

I, W. P. Hurley, Clerk of the District Court of the Eighth Judicial District of the State of Colorado, within and for Larimer County, do hereby certify that —— ——, whose genuine signature is appended to the foregoing certificate, was, at the time of signing the same, Judge of the District Court of Larimer County, of the State of Colorado, duly commissioned and qualified; that full faith and credit are and of right ought to be given to all his official acts as such, in all Courts of Record, and elsewhere.

In testimony whereof I have hereunto set my hand and affixed the seal of said Court, at my office in — Colo., this 22nd day of May, A. D. 1933.

W. P. Hurley, Clerk. (Seal.)

[fol. 2791] DEFENDANT'S EXHIBIT H

IN THE DISTRICT COURT

STATE OF COLORADO,
County of Larimer, ss:

In the matter of the adjudication of priorities of water rights in Irrigation District No. 48, of the State of Colorado, for irrigation and other beneficial uses.

Findings

The following are the findings of fact and law by the Referee upon which the decree, submitted herewith is based, in the matter of the adjudication of priorities of right to the use of water for irrigation and other beneficial uses in Water District No. 48, State of Colorado.

Ditches

No. 55—The Brinker Creek Ditch.
No. 56—The Pine Creek Ditch.
No. 57—The Pine Creek Ditch Extension.
No. 58—The McIntyre Ditch. (Samuel O. Shipp et al.)
No. 59—The Nellie Ditch.
No. 60—The Timothy Ditch.
No. 61—The Grace Creek Ditch, 2nd Enlargement.
No. 62—The Ollie Ditch.

No. 63—The La Garde Ditch Enlargement.
No. 64—The Jimmy Creek Ditch Enlargement.
No. 65—The John Goetz Ditch No. 1.
No. 66—The John Goetz Ditch No. 2.
No. 67—The Shell Creek Ditch.
No. 68—The Dry Creek Ditch.
No. 69—The Thompson Ditch.
No. 70—The Detro Ditch No. 2.
No. 71—The Stub Creek Ditch.
No. 72—The Rawah Ditch.
No. 73—The Rawah and Lower Supply Ditch.
No. 74—The McIntyre Ditch.
No. 75—The Dead Man and Nunn Creek Ditch.
No. 76—The Laramie River Tunnel.
No. 77—The Upper Hills Ditch.
No. 78—The Martin Ditch No. 2, 2d enlargement and extension.
No. 79—The Mansfield Ditch Enlargement.
No. 80—The Mansfield Ditch No. 2 Enlargement.
No. 81—The Mansfield Ditch No. 3.
No. 82—The Stuart Ditch.
No. 83—The Stuart Ditch No. 2.
No. 84—The Link Ditch No. 2 Enlargement.

Reservoirs

No. 3—The Wears Ditch and Reservoir.
[fol. 2792] No. 4—The Johnson Reservoir.
No. 5—The Link Lake Reservoir No. 1.
No. 6—The Link Lake Reservoir No. 2.
No. 7—The Link Lake Reservoir No. 3.
No. 8—The Link Lake Reservoir No. 4.
No. 9—The Link Lake Reservoir No. 5.
No. 10—The Link Lake Reservoir No. 6.
No. 11—The Link Lake Reservoir No. 7.
No. 12—The Link Lake Reservoir No. 8.
No. 13—The Link Lake Reservoir No. 9.
No. 14—The Link Lake Reservoir No. 10.
No. 15—The Link Lake Reservoir No. 11.
No. 16—The Link Lake Reservoir No. 12.
No. 17—The Link Lake Reservoir No. 13.
No. 18—The Link Lake Reservoir No. 14.
No. 19—The Tunnel Reservoir.
No. 20—The Laramie River Reservoir.

The Ditches and Reservoirs in said Water District are numbered as above, and in the decree submitted herewith, are placed in the order of their priority as established by the decree rendered herein.

The Referee finds that owing to geological and geographical conditions, in the irrigation of the lands to meadow in the Laramie River Valley and in Water District #48, it has been necessary for the several appropriators to divert and distribute water through and by means of the several ditches and reservoirs taking water from said stream and its tributaries in quantities largely in excess of that ordinarily required for the irrigation of the relatively small areas situate beneath and irrigated from said several ditches and reservoirs, and that the major portion of the waters so diverted and distributed over said lands, immediately return to the stream or water course adjacent to said lands, and that thereafter the said water so returning and going to make up a portion of the waters of the stream, is rediverted and distributed and returned in like manner by the ditches lower down the stream.

[fol. 2793] The Referee finds that the use of water in the Laramie River Valley in Colorado, at all times heretofore has been and now is limited to the irrigation of meadow lands, and that such use has been made and the water applied beneficially for irrigation purposes only during a period of about 60 days in each year occurring subsequent to the 15th day of May and prior to the 1st day of August, except in occasional instances where use has been made for a short period following the 1st day of August in the irrigation of sage brush lands for the purpose of aiding the clearing and preparation of such lands for meadow purposes.

Each and every of the foregoing general findings shall be deemed to apply to each and every ditch and reservoir diverting and applying water to lands situate in water District #48, and shall be deemed to have been included in and made a part of the separate findings and decree of each of said ditches and reservoirs without specific mention or repetition therein.

[fol. 2794] The Laramie River System of the Greeley-Poudre Irrigation District

The Greeley-Poudre Irrigation District, a quasi-public or municipal corporation, duly organized under the laws of

the State of Colorado, is the owner and claimant herein of a general system of ditches, reservoirs and a tunnel now in process of construction in Water District No. 48, for the diversion, storage and conveyance of waters of the Laramie River and tributaries to the Cache la Poudre River, whence the same will be diverted into and carried, stored, and distributed and applied by means of a system of ditches and reservoirs in Larimer and Weld Counties, owned by the District, for the irrigation of 125,000 acres of land in Tps. 7 and 8 North, Range Sixty seven West; Townships 7, 8, and 9 North, Range sixty six West; Townships 6, 7, 8 and 9 North, Range sixty four West; Townships 6, 7, 8 and 9 North, Range Sixty three West, and Townships 7 and 9 North, Range Sixty two West of the 6th P. M.; all in Weld County, Colorado, which lands go to make up and do constitute The Greeley-Poudre Irrigation District. The system of works, in Water District No. 48, shall be hereinafter designated in this and special findings as the "Laramie River System" of claimant and consists of the following several units, each of which is to a greater or less degree interdependent upon the other units operated therewith, all of which, working either alone or in conjunction one with another, constitute a complete system of works, the operation of each and all of the several units being necessary for the diversion and storage of water by the entire system:

The Rawah Ditch;
The Rawah and Lower Supply Ditch;
The McIntyre Ditch;
The Deadman and Nunn Creek Ditch;
[fol. 2795] The Laramie River Tunnel;
The Link Lake Reservoirs, Nos. 1 to 14 inclusive; and
The Tunnel Reservoir.

The system consists throughout of works requiring great financial outlay. It is located at elevations of from 8,500 feet to 11,500 feet above sea level, a portion thereof being at timber line and in the region or perpetual snows. All of the construction involves tunneling and excavation through mountains and along the steep mountain sides on either side of the Laramie Valley, requiring a greater period of time in the completion thereof than would be required to complete an enterprise of like proportions situate under and surrounded by ordinary conditions. All sup-

plies, machinery and labor must be transported by teams for a distance of from seventy to one hundred miles, in large part over mountain roads, from either Laramie, Wyoming, or Fort Collins, Colorado, under conditions least favorable to economical transportation.

Owing to the altitude, climatic conditions and geographical location of the system, the working season, during which men may be engaged in other than tunnel construction, and the season of transportions of freight, are limited to a short period of from three to four months out of each year. The remoteness of the works from railroads, towns, cities, and labor centers, makes the obtaining of laborers difficult, and requires payment of high wages and maintenance of expensive accommodations. The construction throughout is of hazardous character, requiring the use of dynamite, powder and other explosives and the services of a class of laborers hard to obtain and easily dissatisfied. The shortness of the working season requires a total disorganization of the entire laboring force at the close of each year's work and complete reorganization the next succeeding year. The foregoing and many other obstacles un- [fol. 2796] known to construction of irrigation works in plains or prairie regions or in regions of better climatic conditions and geographical location, require longer periods of time than would otherwise be necessary, reasonable diligence being a question of years as compared with months under ordinary conditions.

The construction of the system of works of the claimant upon the Laramie River were commenced by the initiation of surveys on August 25th, 1902, and since said date the work of engineering and construction has continued with diligence, notwithstanding financial and other obstacles although since 1911 active work upon said system has been in large measure suspended owing to the effect of litigation pending in the United States Supreme Court between Wyoming and Colorado, and involving the right of claimant to divert the waters of the Laramie River by means of this system of works.

The tunnel and other portions of said system are substantially complete and ready for diversion of water, while other portions are only in part constructed, all as will appear from the specific findings herein relative to each of the units of the system.

Owing to the conditions under which the work upon said system was commenced and since prosecuted and the many obstacles to be overcome, as well as those unmentioned as those hereinbefore specified, it is found that more than ordinary diligence has been exercised by the claimant, and its several predecessors, in the prosecution of said system of works from August 25th, 1902, to the present time.

This general finding shall apply to the whole system and each unit thereof and is made to avoid repetition insofar as possible. It shall apply to the several units of the system hereinafter enumerated, without special findings or [fol. 2797] reference hereto in the findings for each unit, and shall be taken as incorporated in and as a part of the findings for each unit.

Each of the several units, while interdependent in large measure upon the other units of the system, nevertheless involves diversions from different tributaries of the Laramie River and is segregated into specific names and findings for the purpose of this decree. Each unit is given the same date of priority, and although different priority numbers are given, nevertheless each unit of said system shall have equal priority with each of the other units thereof.

No. 55—The Brinker Creek Ditch

This ditch is owned and claimed by Watson Ziegler, George A. Webb, and S. E. Eddy. The headgate is located at a point in the southwest quarter (SW¼) of the southeast quarter (SE¼) of section twenty-four (24), township nine (9), north range 76, whence the southeast corner of section 24 bears east 68 degrees and 10 minutes 1374 feet.

The Brinker Creek Ditch derives its supply of water from Brinker Creek, a tributary of the Big Laramie River. The ditch is one foot deep, three feet wide on the bottom, four feet wide on top, with a grade of 75 feet for the first 1300 feet, and a grade of ten feet per thousand from thence into Porter Creek. The ditch has a present carrying capacity of eight cubic feet per second of time, and is used to irrigate approximately forty acres of land. The ditch is entitled to priority by construction for eight cubic feet per second of time of date July 10, 1901, but owing to the fact that the then owner of the ditch and appropriations of water therethrough failed to make claim and have his

rights adjudicated at the time of the adjudication of priorities of right to the use of water in this water district, which said adjudication proceeding was had in this court and de-[fol. 2798] cree therein entered on the 11th day of October, 1906, claimant will be awarded Priority No. 67 and the date of the appropriation of water is fixed at July 10, 1901, but the claimant will not be permitted to take water from said stream for irrigation when the same will be required for use by the lowest appropriator in point of time as found and adjudged in said decree of October 11, 1906.

No. 56—The Pine Creek Ditch

This ditch is owned by Samuel O. Shipp. The headgate is located at a point which bears south 49 degrees, 22 minutes west 2562 feet from the quarter corner on the east side of Section 20, Township 10, N. Range 76 W.

The source of supply of water for this ditch is Pine Creek, a tributary of McIntyre Creek, which is a tributary of the Big Laramie River. The ditch is about one mile in length, with a top width of 4.5 feet and a bottom of 3.4 feet, a water depth of 1.2 feet, and a grade of 2.3 feet per thousand feet, and carrying capacity of 7.5 cubic feet of water per second of time. The ditch is used to irrigate approximately 75 acres of land. This ditch is entitled to priority No. 70, by construction of 4 cubic feet per second of time, bearing date the 20th day of August, 1902.

No. 57—The Pine Creek Ditch Extension.

This ditch is owned by Samuel O. Shipp, R. E. Moan and J. F. Moan. The headgate of this ditch is identical with the headgate of the Pine Creek Ditch, to-wit, at a point which bears south 49 degrees, 22 minutes west 2562 feet from the quarter corner on the east side of Section 20, Township 10, N. Range 76 West, and is an extension of the said, The Pine Creek Ditch. This extension ditch is about one half mile long, a top width of two feet, a bottom width of 1½ feet and [fol. 2799] a water depth of 1 foot, and a carrying capacity of 1.75 cubic feet per second of time. It is used to irrigate about 60 acres of land. It is entitled to Priority No. 87, by construction for 1.75 cubic feet of water per second of time, bearing date the 8th day of July 1911.

No. 58—The McIntyre Ditch

The owners of this ditch are R. E. Moan, J. F. Moan and Samuel O. Shipp. The headgate of this ditch is located at a point which bears south 28 degrees, 20 west 635 feet from the quarter corner on the east side of Section 20, Township 10, N. Range 76 West.

The source of supply of water for this ditch is McIntyre Creek, a tributary of the Big Laramie River. This ditch is 8 feet wide on top, 6 feet wide on the bottom, a water depth of 2.5 feet, a grade of 9 feet per thousand feet, and a carrying capacity of 19 cubic feet per second. This water is used to irrigate about 140 acres of land. This ditch is entitled to Priority No. 81 by construction for 7 cubic feet of water per second of time, bearing date the 25th day of July, 1908.

No. 59—The Nellie Ditch

The owner of this ditch is Mrs. Nellie Thompson. The headgate of the ditch is located at a point which bears south 31 degrees, 27 minutes west 1228 feet from the Northwest corner of Section 1, Township 10 N. Range 77 West of the 6th P. M. The source of supply of water for this ditch is McQuire Creek, a tributary of La Garde Creek, which is a tributary of the Big Laramie River. The ditch is five feet wide on the bottom, 8 feet wide on top, and a water depth of two feet, with a grade of 10 feet per mile, and a carrying capacity of 15.3 per second. This water is used to irrigate about 200 acres in conjunction with the Thompson ditch. This ditch is entitled to priority No. 76, by construction [fol. 2800] for 15.3 cubic feet of water per second of time, bearing date the 10th day of September, 1903.

No. 60—The Timothy Ditch

The owners of this ditch are Hannah Mansfield and Elton Mansfield and John Mansfield. The headgate of the ditch is located at a point south 21 degrees west 39 chains and 68 links from the north quarter corner of Section 23, Township 10 North, Range 76 West of the 6th P. M. The source of supply of water for this ditch is the Big Laramie River. Construction of this ditch was commenced on the 5th day of July, 1904. The ditch is about 6 miles in length, with a width of 7 feet on the bottom, 10 feet on top, and a

water depth of about 2 feet, and a grade of 5.5 feet per mile. The capacity of the ditch is 34.36 cubic feet per second. This witch is used to irrigate about 200 acres of land, and is capable of irrigating about 1500 acres as the same can be brought under cultivation. The ditch is entitled to Priority No. 77 by construction, for 34.36 cubic feet of water per second of time, bearing date the 5th day of July, 1904.

No. 61—Grace Creek Ditch, Second Enlargement

This ditch is owned by Everett D. Bullard. The headgate of the ditch is located on the left bank of the Grace Creek a tributary of the Laramie River on the Northwest quarter of the Northwest Quarter of Section 14, Township 11, N. Range 77 West of the 6th P. M., at a point south 37 degrees 45 minutes east 574 feet from the Northwest corner of said section 14. The capacity of this ditch, by original construction, was 3.07 feet of date April 1st, 1888, and by first enlargement of 6.3 cubic feet per second of April 28th, 1900. The source of supply of the ditch is the water of Grace Creek and the Big Laramie River, Grace Creek being a tributary of the Big Laramie River. The ditch as en- [fol. 2801] larged is 7 feet wide on top, 6 feet wide on the bottom, with a water depth of 2½ feet and a grade of 9 feet per mile, and a total carrying capacity of 20 cubic feet of water per second of time. The water of this second enlargement is used in conjunction with the priorities for this ditch by original construction, and by first enlargement, for the irrigation of about 480 acres. This second enlargement is entitled to Priority No. 80 for 10 cubic feet of water per second of time, of date the 1st day of April, 1907.

No. 62—The Ollie Ditch

The owner of this ditch is Elton Mansfield. The headgate of the ditch is located at a point on the west bank of Jimmy Creek, a tributary of the Big Laramie River, south 13 degrees 33 minutes east 1730 feet from the west quarter corner of Section 27, Township 11, North Range 76 West of the 6th P. M. The length of the ditch is about 3,000 feet. The ditch has a bottom width of 3.5 feet, a water depth of 10 inches, and a grade of 1.5 feet per thousand feet and a carrying capacity of 3.45 cubic feet of water per second of

time. The water of this ditch is used to irrigate about 60 acres of land.

This ditch was originally constructed in the spring of 1886, and water was applied for beneficial purposes in the irrigation of lands in that same year. The ditch is entitled to priority for the use of water for irrigation purposes to the amount of its Appropriation to-wit, 3.45 cubic feet per second of time, as of date June 1st, 1886, but owing to the fact that the then owner of the ditch and appropriations of water there through failed to make claim and have his rights adjudicated at the time of the adjudication of priorities of the right to the use of water in this water district, which said adjudication proceeding was had in this [fol. 2802] Court and decree therein entered on the 11th day of October, 1906, claimant will be awarded Priority No. 61, and the date of the appropriation of water is fixed at June 1st, 1886, but the claimant will not be permitted to take water from said stream for irrigation when the same shall be required for use by the lowest appropriator in point of time as found and adjudicated in said decree of October 11th, 1906.

No. 63—The La Garde Ditch Enlargement

The owners of this ditch are J. H. Detro, T. Forrester and Thomas Tatham. The headgate of the enlargement is located at the same point as the headgate of the La Garde Ditch, having Priority No. 11, of date June 10th, 1883. The source of supply of water for this enlargement is La Garde Creek, a tributary of the Big Laramie River. The ditch as enlarged is * * * feet wide on top * * * feet wide on the bottom, with a water depth of * * * feet, and a grade of * * * feet per mile, and a total carrying capacity of 15.2 cubic feet of water per second of time. Construction of this enlargement was commenced prior to the 1st day of June, 1896, and the water of the ditch as enlarged is used to irrigate 215 acres of land.

This ditch was originally enlarged prior to June 1st, 1896, and water was applied for beneficial purposes in the irrigation of lands prior to said date, but claim is made for Priority as of date June 1st, 1896. The ditch is entitled to priority for the use of water for irrigation purposes to the amount of its appropriation to-wit, 4.87 cubic feet of water per second of time by enlargement, as of date June 1st,

1896, but owing to the fact that the then owner of the ditch and appropriations of water therethrough failed to make claim and have his rights adjudicated at the time of the adjudication of priorities of the right to the use of water in this water district, which said adjudication proceeding [fol. 2803] was had in this Court and decree therein entered on the 11th day of October, 1906, claimant will be awarded Priority No. 64, and the date of the appropriation of water is fixed at June 1st, 1896, but the claimant will not be permitted to take water from said stream for irrigation when the same shall be required for use by the lowest appropriator in point of time as found and adjudicated in said decree of October 11th, 1906.

No. 64—Jimmy Creek Ditch Enlargement

The owner of this ditch is Thomas Tatham. The headgate of this ditch, as enlarged, are identical with the headgates of the Jimmy Creek Ditch, having Priority No. 14, of date June 1st, 1884, said ditch having two headgates and two sources of supply of water, namely, from the East bank of Jimmy Creek, and from the east bank of the Big Laramie River. The source of supply of water for this ditch is Jimmy Creek and the Big Laramie River, water being used from the Big Laramie River after the supply in Jimmy Creek has been exhausted. The ditch as enlarged is 4 feet wide on top, 4 feet wide on the bottom, with a water depth of 1.5 feet, and a carrying capacity of 15 cubic feet of water per second of time. The ditch is used for the irrigation of 200 acres of land.

This ditch was originally enlarged prior to June 2d, 1896, and water was applied for beneficial purposes in the irrigation of lands prior to said date, but claim is made for Priority as of June 2, 1896. The ditch is entitled to Priority for the use of water for irrigation purposes to the amount of its appropriation, to-wit, 15 cubic feet of water per second of time, as of date June 2d, 1896, but owing to the fact that the then owner of the ditch and appropriations of water therethrough failed to make claim and have his rights adjudicated at the time of the adjudication of priorities of the right to the use of water in this water district, [fol. 2804] which said adjudication proceeding was had in this Court and decree therein entered on the 11th day of October, 1906, claimant will be awarded Priority No. 65 by

enlargement and the date of the appropriation of water is fixed at June 2d, 1896, but the claimant will not be permitted to take water from said stream for irrigation when the same shall be required for use by the lowest appropriator in point of time as found and adjudicated in said decree of October 11th, 1906.

No. 65—The John Goetz Ditch No. 1

The owner of this ditch is E. M. Hohnholz. The headgate of the ditch is located on the right bank of Shell Creek, a tributary of Sand Creek, at a point whence the Southwest corner of Section 24, Township 12, North Range 76 west of the 6th P. M. bears south 52 degrees 5 minutes west 1,745 feet. The source of supply of water for this ditch is Shell Creek. The ditch is about 6 feet wide on top, 5 feet wide on the bottom, with a water depth of one foot, and a grade of 5 feet per mile, and a carrying capacity of 7.8 cubic feet of water per second of time. The ditch is used for the irrigation of about 100 acres of land.

This ditch was originally constructed in the spring of 1879, and water was applied for beneficial purposes in the irrigation of lands in June of that year. The ditch is entitled to priority for the use of water for irrigation purposes to the amount of its appropriation, to-wit, 7.8 cubic feet, per second of time, as of date June 1st, 1879, but owing to the fact that the then owner of the ditch and appropriation of water there through failed to make claim and have his rights adjudicated at the time of the adjudication of priorities of the right to the use of water in this water district, which said adjudication proceeding was had in this Court and decree entered on the 11th day of October, 1906, claimant will be awarded priority No. 60, and the date of [fol. 2805] appropriation of water is fixed at June 1st, 1879, but the claimant will not be permitted to take water from said stream for irrigation when the same shall be required for use by the lowest appropriator in point of time as found and adjudicated in said decree of October 11th, 1906.

No. 66—The John Goetz Ditch No. 2

This ditch is owned by E. M. Hohnholz. The headgate of the ditch is located on the left bank of Shell Creek, a tributary of Sand Creek, at a point when the west quarter

corner of Section 25, Township 12, North Range 76 West of the 6th P. M. bears south 75 degrees, fifteen minutes west 440 feet. The ditch is 6 feet wide on top, 5 feet wide on the bottom, a water depth of 1 foot, and a grade of 10 feet per mile, and a carrying capacity of 10 cubic feet per second, and is used to irrigate about 200 acres of land. This ditch is entitled to Priority No. 83 by construction for 10 cubic feet of water per second of time, of date the 9th day of June, 1909.

No. 67—The Shell Creek Ditch

The owner of this ditch is E. M. Hohnholz. The headgate of the ditch is located on the right bank of Shell Creek, a tributary of Sand Creek, at a point whence the west quarter corner of Section 25, Township 12, North Range 76 West of the 6th P. M., bears north 69 degrees, 52 minutes east 541 feet. The source of supply of water for this ditch is Shell Creek. The ditch is 5 feet wide on top, 3 feet wide on the bottom, a water depth of 1 foot, and a grade of 10 feet per mile, and a carrying capacity of 6.97 cubic feet of water per second. This ditch is used to irrigate about 80 acres of land. This ditch is entitled to Priority No. 84 by construction, for 6.97 cubic feet per second, bearing date the 10th day of June, 1909.

[fol. 2806] No. 68—The Dry Creek Ditch

The owner of this ditch is E. M. Hohnholz. The headgate of the ditch is located at a point on the left bank of Dry Creek, whence the east quarter corner of Section 25, Township 12, North Range 76, West of the 6th P. M., bears north 54 degrees east 970 feet. The source of supply of water for this ditch is Dry Creek. The ditch is 6 feet wide on top, 5 feet wide on the bottom, with a water depth of 1 foot, and a grade of 10 feet per mile, and a carrying capacity of 10 cubic feet per second of time. The waters of this ditch are used to irrigate about 125 acres. This ditch is entitled to Priority No. 85 by construction, for 10 cubic feet of water per second of time, bearing date the 11th day of June, 1909.

No. 69—The Thompson Ditch

The owner of this ditch is Mrs. Nellie Thompson. The headgate of the ditch is located at a point which bears

south 57 degrees, 50 minutes west 12,100 feet from the northeast corner of Section 1, Township 10 North, Range 77 West of the 6th P. M. The source of supply of this ditch is British Creek No. 2, a tributary of McIntyre Creek. The width of the ditch is 3 feet 3 inches on the bottom, with a slope of bank 1 to 1, and a water depth of 1.5 feet, and a grade of 10 feet per mile, and a carrying capacity of 5 cubic feet of water per second. This water is used to irrigate about 80 acres of land. This ditch is entitled to Priority No. 82 by construction, for 5 cubic feet of water per second of time, bearing date the 26th day of May, 1909.

No. 70—The Detro Ditch No. 2

The owner of this ditch is J. H. Detro. The headgate of the ditch is located at a point on the east bank of the Laramie River, south 77 degrees, 3 minutes east 1500 feet from the west quarter corner of Section 7, Township 11, North [fol. 2807] Range 76 West of the 6th P. M. The source of supply of this ditch is the Big Laramie River. The ditch is 3 feet wide on the bottom, a slope of banks 1 to 1, a water depth of 1.5 feet, and a grade of 1 foot to 1200 feet, and a carrying capacity of 8 cubic feet of water per second. This ditch is used to irrigate about 45 acres of land. The ditch is entitled to Priority No. 79, by construction, for 8 cubic feet of water per second of time, bearing date the 16th day of January, 1906.

No. 71—Stubb Creek Ditch

The owner of this ditch is Thomas H. Davy. The headgate of the ditch is on the west bank of Stubb Creek, at a point whence the northeast corner of Section 35, Township 10, North Range 76 West of the 6th P. M., bears north 80 degrees, 20 minutes east 1586 feet. The source of supply of water for this ditch is Stubb Creek, a tributary of the Big Laramie River. The ditch is 4 feet wide on top, 2 feet wide on the bottom, with a water depth of 1 foot, and a grade of 2 feet per thousand feet, and a carrying capacity of 5 cubic feet of water per second. The water is used to irrigate about 150 acres of land. This ditch is entitled to Priority No. 88, by construction, for 5 cubic feet of water per second of time, bearing date the 28th day of July, 1911.

No. 72—The Rawah Ditch of the Laramie River System

The claimant of this ditch is The Greeley-Poudre Irrigation District, a quasi-public or municipal corporation, organized and doing business under the laws of the State of Colorado, whose postoffice address is Greeley, Weld County, Colorado.

Said ditch derives its supply of water from Rawah, West Springer, Rapid, Fall, Winifred and Mill Creeks and divers other creeks, situate between Rawah Creek and the West [fol. 2808] Fork of the Laramie River, and the several tributaries of said several creeks. Each of the aforesaid streams are tributary to the Laramie River, entering said stream on the west side thereof, and each thereof is intersected by the said canal and the waters thereof diverted and conveyed by means of said ditch to the West Fork of the Laramie River, through and by means of said West Fork to the Tunnel Reservoir and thence through the Laramie River Tunnel to the Cache la Poudre River.

This ditch is sometimes known as "The Link Lake Ditch," "The Upper Collection Ditch," "The Upper West Side Ditch," "The Timber Line Collection Ditch," or "The Upper Ditch," of the Laramie River system of claimant. The said ditch not only diverts and carries water from the several streams and tributaries of the Laramie River aforesaid, but, also, in conjunction with The Link Lakes Reservoirs, The McIntyre Ditch, and the Lower Rawah & Supply Ditch and the Tunnel Reservoir, will be used for the carriage of waters stored in said The Link Lakes Reservoirs, or diverted from McIntyre Creek by means of the McIntyre Ditch, in manner more particularly set forth in the findings and decree pertinent to said reservoirs and said McIntyre Ditch. The McIntyre Ditch is in fact but a continuation or extension of the line of the Rawah Ditch, from Rawah Creek to McIntyre Creek, and is so constructed that the water thereby diverted and carried may be conveyed to the Laramie River Tunnel through either the Rawah Ditch or The Rawah & Lower Supply Ditch, and the flow thereof conserved, controlled and regulated by those of The Link Lakes Reservoirs situate below the line of The Rawah Ditch, as well as those of said reservoirs situate on McIntyre Creek.

The headgate or place of beginning of said ditch is in the east bank of Rawah Creek, in Larimer County, Colorado, near a point in the NE¼, SW¼ of Section 32, Town- [fol. 2809] ship 9 North, Range 76 West of the 6th P. M., whence the southwest corner of said section 32 bears South 50°50′ West 2950 feet. Said ditch extends thence in a general easterly and southerly direction through all, or portions, of Sections 32 and 33, Township 9 North, Range 76 West; Sections 4 and 5, Township 8 North, Range 76 West; Sections 33, 34 and 35, Township 9 North, Range 76 West, and Sections 2, 3 and 11, Township 8 North, Range 76 West of the 6th P. M., a total distance of about 6.4 miles to the point where said ditch discharges the waters thereby diverted and carried, into the West Fork of the Laramie River at a point not far distant from the headgate of the "Skyline Ditch" of The Water Supply & Storage Company and above the Tunnel Reservoir and Laramie River Tunnel. The said ditch is practically at timber line and situate 1500 to 2000 ft. higher in elevation than The Rawah & Lower Supply Ditch or the "Skyline Ditch" of The Water Supply & Storage Company.

The dimensions, size, grade and carrying capacity of said ditch are as follows: Width on bottom 6 feet, depth below high water line 4 feet, slopes of banks 1 to 1, grade 3 feet per thousand feet, or 15.84 feet per mile, save at various places along said ditch, where, by virtue of greatly increased grade, the same carrying capacity of said ditch is maintained, although the ditch is of reduced dimensions varying with the conditions under which said increased fall occurs. Said ditch has and will have a carrying capacity of 225 cubic feet of water per second of time. It is completed to a point within about one mile from its headgate on Rawah Creek, and is now in use for the diversion of waters from the several creeks by it intersected along the line of its present construction. The waters so diverted have been carried and discharged into the West Fork of the Laramie River and have been permitted to flow down [fol. 2810] the Laramie River during the construction and completion of the Laramie River Tunnel and the Tunnel Reservoir. Said ditch has, at the several points of intersection with the several streams aforesaid, appliances for the control of water flowing in said creeks, thereby giving said ditch several points of diversion.

It is also used for the carriage of water delivered to it at its headgate on Rawah Creek, by the McIntyre Ditch, in manner aforesaid, and waters stored in Link Lakes Reservoirs Nos. 1 to 11 inclusive, all for the better diversion, flow and equalization of the flow of waters into and through said ditch, said reservoirs or The Lower Rawah Supply Ditch. It will be used as a part, parcel or unit of the entire collection, regulation, diversion and carriage system of works of the claimant on the Laramie River, and, particularly, on the west side thereof, to the end that water may be maintained in said canal to the full carrying capacity thereof.

Work was commenced on this ditch, along with the several other ditches, reservoirs and the tunnel, constituting the Laramie River System of the claimant, on or about August 25, 1902, and has since hitherto been prosecuted with due diligence by the claimant and its predecessors in title and interest, but owing to the fact that said ditch is not completed, and no beneficial use has been made of the waters diverted by means of the constructed portion thereof, no findings in behalf of said ditch can be made, save as to the date and number of its priority, which is hereby fixed as August 25, 1902, and its priority is numbered No. 71. The amount of its appropriation when finally fixed and determined, insofar as its diversion of water from the several creeks aforesaid is concerned, shall be limited [fol. 2811] to 225 cubic feet of water per second of time from any and all of said streams, with the right to maintain the flow in said ditch constant at said capacity by the use of the Link Lakes Reservoirs 1 to 11 inclusive, the McIntyre Ditch and the other works of the district as interdependent and co-ordinate works, and sufficient by diversion of this and all other units of said system for the irrigation of not to exceed 125,000 acres of land.

No. 73—The Rawah & Lower Supply Ditch of the Laramie River System

The claimant of this ditch is The Greeley-Poudre Irrigation District, a quasi-public or municipal corporation, organized and doing business under the laws of the State of Colorado, whose postoffice address is Greeley, Weld County, Colorado.

Said ditch takes its supply of water from Rawah, West Springer, Rapid, Fall, Winfred, Mill and divers other creeks situate between the Rawah Creek and the Laramie River Tunnel, each of which said creeks is a tributary of the Laramie River, entering said stream on the west side thereof and is intersected by the said canal and the waters of each thereof are diverted and conveyed by means of said ditch to the Tunnel Reservoir of the claimant, and thence through the Laramie River Tunnel to the Cache la Poudre River.

This ditch is sometimes known as "The Lower Supply Ditch," "The Lower Rawah Ditch," "The West Side Collection Ditch," "The West Side Ditch" or "The West Feeder Ditch," and includes under one name separate units of said ditch line heretofore known as "The Rawah Pipe Ditch," "The Rawah Pipe Line," "The Fall Creek Ditch," [fol. 2812] and "The Fall Creek Pipe Line," (said pipe lines being now substituted by tunnels along the line of this ditch) of the Laramie River System of claimant. The said ditch not only diverts and carries water from the several streams and tributaries of the Laramie River aforesaid, but also, and in conjunction with the Rawah Ditch, McIntyre Ditch, Link Lakes Reservoirs and Tunnel Reservoir, will be used for the carriage of waters stored in Link Lakes Reservoirs or diverted from McIntyre Creek by means of the McIntyre Ditch, in manner more specifically set forth in the findings and decree pertinent to said reservoir and McIntyre Ditch.

The headgate or place of beginning of said ditch is in the east or south bank of Rawah Creek in Larimer County, Colorado, near a point in the Southwest Quarter (SW¼) Southeast Quarter (SE¼) of Section Fourteen (14), Township Nine (9) North, Range Seventy-six (76) West of the 6th P. M., whence the southeast corner of said section bears South 71°/0′ West about 2540 feet distant. Said ditch extends thence in a general southeasterly direction a distance of about 4.7 miles and traverses portions of Sections 14, 23, 25, 26 and 36 in Township Nine (9) North, Range 76 West; Sections 1 and 12, Township Eight (8) North, Range 76 West, and Section 7, Township Eight (8) North, Range 75 West of the 6th P. M., to the east terminus thereof, being the point where the said ditch discharges its waters into the bed and channel of the Laramie River,

at or near the west portal of the Laramie River Tunnel and into the accumulation basin of the Tunnel Reservoir. The said ditch intersects the several streams aforesaid along its course, and has at each of said points of intersection appliances for diversion, thereby constituting, as to each of such, a point of diversion at the said point of intersection of the line of said ditch with the thread of each of [fol. 2813] such streams.

The said ditch is divided into four divisions, for purpose of description, each of which are, or will be when complete, of the following dimensions, length and capacities:

Division	Material	Bottom width	side slopes of banks	Depth water	Grade per 1000 ft.	Length feet	Cap. cu. ft.
Rawah Creek	Loose	9 ft.	1 to 1	4 ft.	2 ft.	16000	200
	Solid	8 ft.	1–2 to 1	4 ft.	3 ft.		
Rapid Creek	Loose	10 ft.	1 to 1	4.5 ft.	1.5 ft.	2400	250
	Solid	9 ft.	1–2 to 1	4.5 ft.	3 ft.		
Fall Creek	Loose	11 ft.	1 to 1	4.5 ft.	1.5 ft.	3300	270
	Solid	10 ft.	1–2 to 1	4.5 ft.	2.7 ft.		
Mill Creek	Loose	11 ft.	1 to 1	4.6 ft.	1.5 ft.	3100	275
	Solid	10 ft.	1–2 to 1	4.6 ft.	2.7 ft.		

The Link Lakes Reservoirs Nos. 1 to 14 inclusive, as well as the Tunnel Reservoir, are claimed as regulating or expansion basins and works for this ditch, and the Rawah Ditch, hereinafter mentioned, as will appear in the specific findings and decree for each of said reservoirs, and the waters diverted and carried by this ditch are for final discharge into the Cache la Poudre River through the Laramie River Tunnel of claimant.

The said ditch constitutes an essential unit or portion of the diversion and storage system of the claimant in Water District 48, and is to be so used in conjunction with the remaining units of said system as to give to the claimant the maximum diversion, storage and carrying capacity of said system and its several units, including this unit, when [fol. 2814] used singly or in conjunction with one another for the irrigation of not to exceed 125,000 acres of land.

Work was commenced upon this ditch, along with the several other ditches and reservoirs and the tunnel going to make up the several units of the Laramie River diversion and storage system of claimant, on or about August 25, 1902, and has since hitherto been prosecuted with due diligence by the claimant and its predecessors in title and interest, but owing to the fact that said ditch is not wholly completed and no diversion of water has been made thereby no findings in behalf of said ditch can be made, save as to the date and number of its priority, which are hereby fixed as August 25, 1902, and its priority, is numbered Ditch Priority No. 72. The amount of its appropriation, when finally fixed and determined, insofar as its diversion along its line from aforesaid creeks is concerned, shall be limited to 275 cubic feet of water per second of time from all of said streams, with privilege of maintaining the flow in said ditch constant at said capacity by use of the Link Lakes Reservoirs and the Rawah and McIntyre Ditches and other works of the district as expansion, regulating and co-ordinate works, and sufficient by diversions of this and all the other units of said system for the irrigation of not to exceed 125,000 acres of land.

[fol. 2815] No. 74—The McIntyre Ditch

The claimant of this ditch is The Greeley-Poudre Irrigation District, a quasi-public or municipal corporation,

organized and doing business under the laws of the State of Colorado, whose postoffice address is Greeley, Weld County, Colorado.

Said ditch derives its supply of water from McIntyre Creek, a tributary of the Laramie River, at a point near the source of said creek, and is used in conjunction with the Link Lakes Reservoirs, The Rawah Ditch, The Rawah & Lower Supply Ditch, The Tunnel Reservoir, and the Laramie River Tunnel, for the diversion, control and carriage to the Cache la Poudre River of waters of that portion of McIntyre Creek above its point of diversion.

This ditch is sometimes known as the "Westerly Extension of The Rawah Ditch," or the "Upper End of the Rawah Ditch," of The Greeley-Poudre Irrigation District, in Water District No. 48. It not only diverts and carries water from that portion of McIntyre Creek situate above its point of diversion, but will, in conjunction with the other units of the Laramie River System of claimant, be used for carriage of waters stored and regulated by The Link Lakes Reservoirs, in manner as more particularly set forth in the findings and decree pertinent to said reservoirs. The said ditch will constitute a westerly extension of the line of the Rawah Ditch, from Rawah Creek to McIntyre Creek, and will be so constructed that the waters thereby diverted and carried may be conveyed from its point of discharge on Rawah Creek to the Tunnel Reservoir, by means of either The Rawah Ditch or by using Rawah Creek as a carrier down to the point of diversion of The Rawah & Lower Supply Ditch, and thence through said ditch, the Tunnel Reservoir and the Laramie River Tunnel, to the [fol. 2816] Cache la Poudre River. The McIntyre Ditch is about 2,000 feet higher in elevation than the Tunnel Reservoir and Rawah & Lower Supply Ditch. It is situate at timber line and draws its supply of water from the upper extremity of McIntyre Creek and quite near to one of the sources of that stream. The said ditch will, also, in a small measure, intersect certain small tributaries of Rawah Creek, and as to such there is a diversion of the waters therein flowing at said points of intersection.

The headgate or place of beginning of said ditch is upon the east bank of McIntyre Creek, in Larimer County, Colorado, at or near a point in the Northeast Quarter (NE¼) Northeast Quarter (NE¼) of Section Thirty-one (31),

Township Nine (9) North, Range Seventy-six (76) West of the 6th P. M., whence the west corner of said Section Thirty-one (31) bears South 12° 41′ East 4257 feet distant. Said ditch will extend thence in a general southeasterly direction through Sections Thirty-one (31) and Thirty-two (52), Township Nine (9) North, Range Seventy-six (76) West of the 6th P. M., a distance of upwards of a mile, to a point where it will discharge water into Rawah Creek, at or near a point whence the southwest corner of said Section 32 bears South 50° 50′ West 2950 feet distant, which point is near the headgate or intake of The Rawah Ditch, and from which point the waters delivered from the McIntyre Creek may be diverted and carried either through said Rawah Ditch or down Rawah Creek for re-diversion as hereinbefore determined.

The dimensions, size, grade and carrying capacity of said ditch will be as follows:

[fol. 2817] Width on bottom 4 feet, depth below high water line 2.2 feet, slope of bank 1 to 1, grade 3 feet per thousand feet, or 15.84 feet per mile. Said ditch, when complete, of the dimensions aforesaid, will have a carrying capacity of 40 cubic feet of water per second of time.

Said ditch will be used as one of the units of the Laramie River System of the claimant, in conjunction with the various other units of the system, and, particularly, that portion of the works situate on the west side of the Laramie River, for the regulation, control, diversion and carriage of the waters from McIntyre Creek, acting in conjunction with Link Lakes Reservoirs 10 and 11, which said reservoirs act in part as equalization basins for the McIntyre Ditch above its point of diversion on McIntyre Creek.

Work was commenced on this ditch, along with the several other ditches, reservoirs and the tunnel constituting the Laramie River System of the claimant, on or about August 25, 1902, and has since hitherto been prosecuted with due diligence through the prosecution of work upon the balance of said system of which it constitutes a part, but, owing to the fact that said ditch is not completed, and no diversion or carriage of waters has been made thereby, no findings in behalf of said ditch can be made, save as to the date and number of its priority, which is hereby fixed as of August 25, 1902, and its priority is numbered Ditch Priority No. 73.

The amount of its appropriation when finally fixed and determined shall be limited to 40 cubic feet of water per second of time from McIntyre Creek and its tributaries, with the right to maintain the flow of said ditch constant at said capacity by use of Link Lakes Reservoirs Nos. 10 [fol. 2818] and 11, and sufficient by diversion of this and all other of said units for the irrigation of not to exceed 125,000 acres of land.

No. 75—The Deadman and Nunn Creek Ditch of the Laramie River System

The claimant of this ditch is The Greeley-Poudre Irrigation District, a quasi-public or municipal corporation, organized and doing business under the laws of the State of Colorado, whose postoffice address is Greeley, Weld County, Colorado.

Said ditch derives its supply of water from Deadman, Nunn, Porter, Brinker, East Springer, Half Mile Creeks and several other small streams of unknown names situate between Brinker Creek and the Laramie River Tunnel. Said streams are tributary to the Laramie River, entering said stream on the east side thereof, and each of said streams is intersected by said ditch and the waters thereof diverted by said canal and conveyed to the Tunnel Reservoir and the west portal of the Laramie River Tunnel and thence through said tunnel to the Cache la Poudre River.

This ditch is sometimes known as "The East Side Collection Ditch," "The Deadman Ditch," or "The East Side Ditch" of the Laramie River System of claimant, in Water District No. 48. Said ditch has several points of diversion, which are identical with the points of intersection of said ditch with the aforesaid streams. Its first headgate or place of beginning is located upon the south or west bank of Deadman Creek, in Larimer County, Colorado, in the Northeast Quarter (NE¼) Southwest Quarter (SW¼) of Section Thirty-one (31), Township Ten (10) North, Range Seventy-five (75) West of the 6th P. M., at or near a point whence the southwest corner of said section bears South 43° 40′ West 2015 feet distant. Said ditch extends thence [fol. 2819] in a general southerly direction across Section Thirty-one (31), Township Ten (10) North, Range Seventy-five (75) West, Section Thirty-six (36), Township Ten (10) North, Range Seventy-six (76) West, Section One (1),

Township Nine (9) North, Range Seventy-six (76) West, Section Six (6), Seven (7) and Eighteen (18), Township Nine (9) North, Range Seventy-five (75) West, Sections Thirteen (13), Twenty-four (24), Twenty-five (25) and Thirty-six (36), Township Nine (9) North, Range Seventy-six (76) West, Section Thirty-one (31), Township Nine (9) North, Range Seventy-five (75) West, and Sections Six (6) and Seven (7), Township Eight (8) North, Range Seventy-five (75) West, a distance of about 7.6 miles and to the point where said ditch discharges the waters, thereby intercepted, diverted and conveyed, into the Laramie River and thence by means of the Tunnel Reservoir and the Laramie River Tunnel to the Cache la Poudre River.

The dimensions, grade, size and carrying capacity of said ditch vary from the point of beginning to the point of discharge, and are divided into three divisions, as follows:

Division	Material	Bottom width	Side slopes of banks	Water depth	Grade per 1000 ft.	Length feet	Cap. cu. ft.
Deadman	Loose	7 ft.	1 to 1	3.3 ft.	2.5 ft.	15000	125
	Solid	6 ft.	1-2 to 1	3.3 ft.	4.5 ft.		
Nunn	Loose	10 ft.	1 to 1	4.5 ft.	1.5 ft.	1100	250
	Solid	9 ft.	1-2 to 1	4.5 ft.	3.0 ft.		
Porter	Loose	11 ft.	1 to 1	4.5 ft.	1.6 ft.	24000	275
	Solid	10 ft.	1-2 to 1	4.5 ft.	2.7 ft.		

The Tunnel Reservoir is used with this canal (as well all other units of the system) for the better regulation, con- [fol. 2820] trol, temporary accumulation and discharge of waters into the Laramie River Tunnel.

The work was commenced upon this ditch, along with the several other ditches, reservoirs and the tunnel constituting the Laramie River System of claimant, on or about August 25, 1902, and has since hitherto been prosecuted with diligence by the claimant and its predecessors in interest. Owing to the fact that said ditch is not complete and no diversion of water has been made thereby, no findings in behalf of said ditch can be made, save as to the date and number of its priority, which are fixed as of August 25, 1902, and its priority is numbered Ditch Priority No. 74, said number and priority applying to diversion on each and every of said creeks so constituting its source of supply. The amount of its appropriation when finally fixed and determined, insofar as its diversion from the several creeks aforesaid is concerned, shall be limited to 275 cubic feet of water per second of time from all of said streams, with the right to use the said ditch and all other units of said system of the said claimant for the irrigation of not to exceed 125,- 000 acres of land.

No. 76—The Laramie River Tunnel of the Laramie River System

The claimant of this tunnel is The Greeley-Poudre Irrigation District, a quasi-public or municipal corporation, organized and doing business under the laws of the State of Colorado, whose postoffice address is Greeley, Weld County, Colorado.

The Laramie River Tunnel, when used in its capacity as a single diversion unit of the Laramie River System of the claimant and without regard to the use thereof for the carriage of water delivered to it by other units of the system, derives its supply of water from the Laramie River [fol. 2821] and the West Fork of the Laramie River and all tributaries of each of said streams entering the same above the mouth of said West Fork. Said waters are diverted and conveyed, by said tunnel, through the Green Mountains to the Cache la Poudre River for use by the claimant, its water users and consumers, by rediversion and

carriage, storage and application through the remainder of its system of works in Larimer and Weld Counties.

This tunnel is sometimes known as "The Laramie-Poudre Tunnel," or "The Greeley-Poudre Tunnel," of the claimant. It not only diverts and carries waters from the aforesaid streams in the manner as above stated, but, in addition thereto, is used with each and every of the several other units of the Laramie River System of claimant for the carriage of waters diverted, stored, carried and discharged by each and all of said units into said tunnel or into its regulating basin, the Tunnel Reservoir, situate at the west portal of said tunnel.

The intake or point of beginning of the said tunnel is on the east bank of the Laramie River at the mouth of the West Fork and in the NE¼ SW¼ of Section Seven (7), Township Eight (8) North, Range 75 West of the 6th P. M., in Larimer County, Colorado, in Water District No. 48. From thence water is conveyed through an open cut for about 1100 feet to and into the west portal of said tunnel, from which point said tunnel extends in a general easterly-southeasterly direction under and through a range of mountains known as the Green Mountains and constituting the watershed between the Laramie and Cache la Poudre Rivers, a distance of about 12,400 feet (including the 1100 feet of open cut aforesaid) and through portions of Sec- [fol. 2822] tions 7, 8, 9 and 16, Township 8 North, Range 75 West of the 6th P. M. The waters conveyed through said tunnel are discharged near a point in the NW¼ NE¼ of Section Sixteen (16), Township 8 North, Range 75 West of the 6th P. M., whence the northwest corner of said Section 16 bears South 81° 35′ West about 3280 feet distant, and flow thence to the Cache la Poudre River.

Said tunnel is 9½ feet wide by 7½ feet high in the clear. It has a grade of 1.7 feet per one hundred feet and an estimated carrying capacity, without pressure of water in the Tunnel Reservoir, of about 1,000 cubic feet of water per second of time.

Said tunnel has a two-fold purpose, to-wit:

1st. For the diversion of waters from the Laramie River and the West Fork thereof at its point of intake and the conveyance of said waters to and into the Cache la Poudre River for purposes of irrigation as aforesaid.

2nd. As an integral part, unit or portion of the entire Laramie River System of ditches, reservoirs and tunnel of claimant, including the McIntyre, Rawah, Rawah & Lower Supply and Deadman and Nunn Creek Ditches, the Link Lakes Reservoirs and the Tunnel Reservoir, each in this proceeding by separate findings described, and to be used in conjunction with the said remaining units or portions of said system for the conveyance of the waters collected, regulated, carried and discharged at the west portal by said ditches and reservoirs, in such manner as to give the maximum diversion, collection, storage and carrying capacity to said system and its various units or parts for the irrigation of 125,000 acres of land.

The increased head or pressure at the west portal of said tunnel, occasioned by increased depth of water in the Tun-
[fol. 2823] nel Reservoir, will give said tunnel an additional estimated carrying capacity of about 235 cubic feet of water per second of time, when said reservoir is filled to its high water line, and a total estimated carrying capacity of 1235 cubic feet of water per second of time by the use of said reservoir as a regulating, accumulation or controlling basin.

Work was commenced on said tunnel, along with the several other units of said Laramie River System of claimant, on or about August 25, 1902, and has since hitherto been prosecuted with exceptional diligence by claimant and its predecessors in title and interest, having been constructed at a speed exceeding all records theretofore established in the history of tunnel construction in tunnels of like dimension. The rock work was completed July 25, 1911, since which date various improvements have been made upon the same by claimant. It has not been used for the diversion or carriage of water owing to conditions growing, in large measure, out of litigation between Wyoming and Colorado, pending in the United States Supreme Court and involving the right of claimant to use said tunnel for the diversion of waters of the Laramie River. Owing to the fact that no diversion or beneficial use of water has been made by means of said tunnel, no findings and decree in that behalf can be made, save as to the date and number of its priority, which is hereby fixed as of August 25, 1902, and its priority is numbered Ditch Priority No. 75. The

amount of its appropriation when finally fixed and determined, shall be limited to its present dimensions, grade and capacity from all sources of supply and diverted by said tunnel and each of its said co-ordinate units, for the irrigation of not to exceed 125,000 acres of land.

[fol. 2824] No. 77—The Upper Hills Ditch

This ditch is owned by the Greeley-Poudre Irrigation District. The headgate is located on the east bank of the Laramie River, at a point, whence the south quarter corner of Section 34, Township 11, North Range 76 West of the 6th P. M., bears south 73 degrees 18 minutes east 2345 feet. The source of supply of water for this ditch is the Big Laramie River. The ditch is 5 feet wide on top, 4 feet wide on the bottom with a water depth of 2 feet, a grade of 2 feet per thousand, and a carrying capacity of 10 cubic feet of water per second of time. This ditch is used for the irrigation of about 200 acres of land.

This ditch was originally constructed in the spring of 1887, and water was applied for beneficial purposes in the irrigation of lands of the same year. The ditch is entitled to priority for the use of water for irrigation purposes to the amount of its appropriation, to-wit, 10 cubic feet of water per second of time, as of date May 1, 1887, but owing to the fact that the then owner of the ditch and appropriations of water there through failed to make claim and have his rights adjudicated at the time of the adjudication of priorities of the right to the use of water in this water district, which said adjudication proceeding was had in this Court and decree therein entered on the 11th day of October, A. D. 1906, claimant will be awarded Priority No. 62, and the date of appropriation of water is fixed at May 1st, 1887, but the claimant will not be permitted to take water from said stream for irrigation when the same shall be required for use by the lowest appropriator in point of time as found and adjudicated in said decree of October 11th, 1906.

[fol. 2825] No. 78—Second Enlargement and Extension of Martin Ditch No. 2

The owner of the enlargement and extension is The Greeley-Poudre Irrigation District. The headgate of the

ditch is located on the west bank of the Laramie River, at a point whence the north quarter corner of Section 10, Township 10, North Range 76 West of the 6th P. M., bears north 4 degrees, 35 minutes west 1920 feet. The source of supply of water for this ditch is the Big Laramie River. The ditch as enlarged by the claimant is nine feet wide on top, 7 feet wide on the bottom, with a grade of 1 foot per thousand feet and a water depth of 2 feet, with a carrying capacity of 26 cubic feet of water per second, and the size of the extension of the Martin Ditch No. 2. is four feet wide on the top, 2 feet wide on the bottom, a water depth of 2 feet, and a grade of 2 feet per thousand feet, and a carrying capacity of 6 cubic feet of water per second of time. This ditch is used to irrigate about 80 acres of land. The ditch is entitled to Priority No. 86, by enlargement and extension, for 6 cubic feet of water per second of time, bearing date the 25th day of May, 1910.

No. 79—Enlargement of the Mansfield Ditch

The owner of this ditch and the enlargement thereof is The Greeley-Poudre Irrigation District. The headgate of the Enlargement is identical with the headgate of the Mansfield Ditch as shown in the former decree of this court, said ditch being Priority No. 8 of date April 20, 1882. The ditch as enlarged is 6 feet wide on the bottom, 8 feet wide on top, a water depth of 1.8 feet and a grade of 5.28 feet per mile, and a carrying capacity of 27.22 cubic feet of water per second. The source of supply of water for this ditch and its enlargement is the Big Laramie River. [fol. 2826] This ditch is used for the irrigation of 75 acres of land. The ditch is entitled to priority by enlargement for 4 feet additional, making a total of 15.61 cubic feet of water per second of time, bearing date the 1st day of April, 1902, but owing to the fact that the then owner of the ditch and appropriations of water therethrough failed to make claim and have his rights adjudicated at the time of the adjudication of priorities of right to the use of water in this water district, which said adjudication proceeding was had in this court and decree therein entered on the 11th day of October, 1906, claimant will be awarded Priority No. 68 and the date of the appropriation of water is fixed at April 1, 1902, but the claimant will not be permitted to take water from said stream for irrigation when the same

will be required for use by the lowest appropriator in point of time as found and adjudged in said decree of October 11, 1906.

No. 80—The Enlargement of Mansfield Ditch No. 2

The owner of the Enlargement of the Mansfield Ditch No. 2 is The Greeley-Poudre Irrigation District. The headgate of this ditch is located at the identical point of the location of the headgate of the Mansfield Ditch No. 2, as heretofore fixed by decree of this court wherein said ditch was given Priority No. 1, as of date June 1, 1880. The source of supply of this enlargement is the water of the Big Laramie River. The ditch as enlarged is 4 feet wide on the bottom, 6 feet wide on top, a water depth of 1.8 feet, and a grade of 5.28 feet per mile, and a carrying capacity of 21.74 cubic feet of water per second. The ditch [fol. 2827] as enlarged is used for the irrigation of about 150 acres of land. This ditch is entitled to priority by enlargement for 1.9 cubic feet of water per second of time, bearing date the 15th day of April, 1902, but owing to the fact that the then owner of the ditch and appropriations of water therethrough failed to make claim and have his rights adjudicated at the time of the adjudication of priorities of right to use of water in this water district, which said adjudication proceeding was had in this court and decree therein entered on the 11th day of October, 1906, claimant will be awarded Priority No. 69 and the date of the appropriation of water is fixed at April 15, 1902, but the claimant will not be permitted to take water from said stream for irrigation when the same will be required for use by the lowest appropriator in point of time as found and adjudged in said decree of October 11, 1906.

No. 81—Mansfield Ditch No. 3

The claimant of this ditch is The Greeley-Poudre Irrigation District, a corporation, whose post office address is Greeley, Weld County, Colorado.

It derives its supply of water from the Laramie River, the headgate thereof being on the west Bank of said stream, at a point bearing south 74 degrees, 45 minutes East 1365 feet from the east quarter corner of Section Two (2), Township Eleven (11) North, Range Seventy Seven (77)

West of the 6th P. M. From its headgate the ditch runs in a general northwesterly direction and when complete will be about one and one half miles in length. It is in a large measure constructed, and will be used for the irrigation of lands on what is known as the Mansfield or Upper Boswell Ranch, and lying and being above the line of the Mansfield Ditch No. 2.

[fol. 2828] It is being constructed of the following dimensions and capacity: Six feet wide on the bottom, eight feet wide on top, water depth two feet, a grade of 5.28 feet per mile, and has a carrying capacity of 29.4 cubic feet of water per second of time. Work was commenced on the construction of said ditch on September 1st, 1904, under the direction of the former owner of said ranch, and has since hitherto been prosecuted with diligence by claimant and its predecessors in interest, but owing to the fact that said ditch is not complete and no diversion of water has been made thereby, no findings on behalf of said ditch can be made, save as to the date and number of its priority which are hereby fixed as of September 1st, 1904, and its priority is numbered Ditch Priority No. 78. The amount of its appropriation when finally fixed and determined shall be limited to the capacity of said ditch, which shall be not to exceed 29.4 cubic feet of water, and the use of the water diverted thereby shall be limited to the irrigation of not to exceed 75 acres of land, in addition to those already irrigated under the Mansfield Ditch No. 2, across which latter lands the return water from this ditch must pass in returning to the river.

No. 82—The Stuart Ditch

This ditch is owned by The Greeley-Poudre Irrigation District. The headgate of the ditch is located on the north bank of Stuart Creek, at a point whence the southwest corner, of Section 5, Township 10, North Range 76 West of the 6th P. M., bears south 10 degrees, east 4045 feet. The source of supply of water for this ditch is Stuart Creek, [fol. 2829] a tributary of McIntyre Creek. The ditch is 3 feet wide on the bottom, 5 feet wide on top, a water depth of 1 foot, a grade of 5.28 feet per mile, and a carrying capacity of 7.2 cubic feet of water per second. The ditch is used for the irrigation of about 25 acres of land.

The ditch was originally constructed in the year 1896, and water was applied for beneficial purposes in the irrigation of lands in the same year. The ditch is entitled to priority for the use of water for irrigation purposes to the amount of its appropriation, to-wit, 7.2 cubic feet of water per second of time, as of date April 15, 1896, but owing to the fact that the then owner of the ditch and appropriations of water there through failed to make claim and have his rights adjudicated at the time of the adjudication of priorities of the right to the use of water in this water district, which said adjudication proceeding was had in this Court, and decree therein entered on the 11th day of October, 1906, claimant will be awarded Priority No. 63, and the date of appropriation of water is fixed at April 15th, 1896, but the claimant will not be permitted to take water from said stream for irrigation when the same shall be required for use by the lowest appropriator in point of time as found and adjudicated in said decree of 11th of October, 1906.

No. 83—The Stuart Ditch No. 2

Claimant of said ditch is The Greeley-Poudre Irrigation District, a corporation, whose post office address is Greeley, Weld County, Colorado. It derives its supply of water from McIntyre Creek, a tributary of the Laramie River, the headgate thereof being located on the east bank of said creek at a point whence the north quarter section cor- [fol. 2830] ner of Section Five (5), Township Ten (10) North Range Seventy-six (76) West, bears north 24 degrees fifty minutes west 7770 feet distant, from which point it runs in a northerly direction for about two miles. Said ditch is being constructed six feet wide on the bottom, eight feet wide on top, capable of carrying water two feet in depth, with a grade of 5.28 feet per mile and a carrying capacity of 29.4 cubic feet of water per second of time, for the irrigation of about 60 acres of land belonging to the claimant, and lying on the east side of McIntyre Creek, which said lands constitute a portion of the west slope of Middle Mountain, which owing to their nature, require a considerable amount of water for their proper irrigation.

Work was commenced on said ditch May 24th, 1913, and has since hitherto been prosecuted with diligence by the

claimant, but owing to the fact that said ditch is not complete and no diversion or application of water has been made thereby, no findings in behalf of said ditch can be made, save as to the date and number of its priority, which are hereby fixed as of May 24th, 1913, and its priority is numbered Ditch Priority No. 89. The amount of its appropriation when finally fixed and determined shall be limited not to exceed 29.4 cubic feet of water per second of time, for the irrigation of not to exceed 60 acres of land, situate as aforesaid.

No. 84—Enlargement of Link Ditch No. 2

The owner of this ditch is The Greeley-Poudre Irrigation District. The headgate of this ditch is identical with the headgate of the Link Ditch No. 2, as heretofore fixed by decree of this Court in Priority No. 32, of date the 15th day of June, 1896. The ditch as enlarged is 2 feet wide on the bottom, 4 feet wide on top, a water depth of 1 foot, [fol. 2831] and a grade of 5.28 feet per mile, and a carrying capacity of 5.4 feet of water per second of time. The ditch as enlarged is used for the irrigation of about 50 acres of land.

This ditch was originally constructed in the spring of 1896, and water was applied for beneficial purposes in the irrigation of lands the same year. The ditch is entitled to Priority for the use of water for irrigation purposes to the amount of its appropriation, to-wit, 5.4 cubic feet of water per second of time, as of date June 15th, 1896, but owing to the fact that the then owner of the ditch and appropriations of water there through failed to make claim and have his rights adjudicated at the time of the adjudication of priorities of the right to the use of water in this water district, which said adjudication proceeding was had in this Court and decree therein entered on the 11th day of October, A. D. 1906, claimant will be awarded Priority No. 66, for 3.4 cubic feet additional and the date of appropriation of water is fixed at June 15th, 1896, but the claimant will not be permitted to take said 3.4 cubic feet of water from said stream for irrigation when the same shall be required for use by the lowest appropriator in point of time as found and adjudicated in said decree of October 11th, 1906.

[fol. 2832] Reservoir Findings

[fol. 2833] No. 3—Wears Ditch & Reservoir

This reservoir is owned by James A. Wears, and is located on Sections 34 and 35, Township 11 North, Range 76 West of the 6th P. M. Water can be stored in this reservoir and drawn off to a depth of 7 feet 6 inhces above the bottom of the outlet tube, and the reservoir has a capacity as now constructed of 2,947,628 cubic feet. The reservoir derives its supply of water from Jim Creek, a tributary of the Big Laramie River in Water District No. 48. This reservoir is used to irrigate about 160 acres of land. The reservoir is entitled to Priority No. 19, by original construction of date October 15th, 1908.

No. 4—Johnson Reservoir

This reservoir is owned by Everett D. Bullard, and is located on parts of Sections 2, 3, 10 and 11, in Township 11 North, Range 77 West of the 6th P. M., and has an area at its upper contour of about 52 acres. Water can be stored and drawn off to a depth of 3 feet and the reservoir has a capacity as now constructed of 6,500,000 cubic feet. This reservoir derives its supply of water from Grace Creek, a tributary of the Big Laramie River, through the Grace Creek Ditch, which ditch has a carrying capacity of 20 cubic feet of water per second of time. This reservoir has been used to irrigate about 100 acres of land.

This reservoir is entitled by original construction to Priority No. 3, bearing date June 1st, 1897.

[fol. 2834] No. 5—The Link Lake Reservoir No. 1

The claimant of this reservoir is The Greeley-Poudre Irrigation District, a quasi-public or municipal corporation, organized and doing business under the laws of the State of Colorado, whose postoffice address is Greeley, Weld County, Colorado.

Said reservoir derives its supply of water, in Water District No. 48, from a branch of Rawah Creek and tributaries thereof entering said stream above the said reservoir. It will be constructed in, upon and across the channel of said branch of Rawah Creek, and has no inlet ditch. It is situate near timber line and at the foot of the snowy range.

Said reservoir is located in Larimer County, Colorado, in the SE¼ of Section 7, Township 8 North, Range 76 West of the 6th P. M. When complete it will have an area at high water line of 30 acres, will be capable of storing water and regulating the flow thereof to a depth of 35 feet and will have a storage and regulating capacity of 45,738,000 cubic feet.

The said reservoir, along with the remaining thirteen Link Lakes Reservoirs, has a two-fold purpose, to-wit:

1st. As an essential part of the Laramie River System of the claimant when used as an expansion or regulating basin for the collection, diversion, control and proper discharge of the waters of Rawah and McIntyre Creeks, into and through the said Rawah Creek as a carrier, and through the McIntyre, Rawah and Lower Supply Ditches into the Tunnel Reservoir, for conveyance, expansion, accumulation, control and final discharge through the Laramie River Tunnel and into the Cache la Poudre River for diversion from said stream to the lands of the claimant.

2nd. For use in the usual manner as a storage reservoir for the storage of waters for agricultural and other bene- [fol. 2835] ficial uses at times other than those when said reservoir shall be in use as a regulating or expansion basin, and when used for such purposes the said creeks, ditches, reservoir and tunnel shall be used as outlet, carriage and discharge works for said reservoir.

Said reservoir constitutes an essential part, unit or portion of the entire Laramie River System of the claimant, and, when completed, will be used in conjunction with the remaining units or portions of said system in such manner as to give the maximum diversion, collection, storage and carrying capacity to said system and its various units or parts for the irrigation of 125,000 acres of land.

Work was commenced upon this reservoir, along with the several other units or portions of the said Laramie River System of claimant, on or about August 25, 1902, and has since hitherto been prosecuted with diligence by the claimant and its predecessors in title and interest. Owing to the fact that such reservoir is not as yet completed, and no use thereof has been made for the collection, storage or diversion of waters, no findings in behalf of said reservoir

can be made, save as to the number and date of its priority, which is hereby fixed as August 25, 1902, and its priority is numbered Reservoir Priority No. 4. Its appropriation shall not exceed a storage depth of 35 feet above the bottom of the outlet tube and a capacity of 45,738,000 cubic feet, and in addition thereto the right to use said reservoir and any or all of its capacity, in conjunction with the other reservoirs and units of said system of irrigation works, and, particularly, the Rawah Ditch, The Rawah & Lower Supply Ditch, the Tunnel Reservoir and the Laramie River Tunnel, for the better regulation of the flow, delivery and [fol. 2836] discharge of waters through said units, to the several carrying and regulating capacities of each thereof, as more particularly specified in the findings and decree pertinent to each. Said appropriation shall also be limited in said decree to the irrigation of 125,000 acres of land by means of said reservoir and all the other units and portions of the said irrigation system of claimant.

No. 6—The Link Lake Reservoir No. 2

The claimant of this reservoir is The Greeley-Poudre Irrigation District, a quasi-public or municipal corporation, organized and doing business under the laws of the State of Colorado, whose postoffice address is Greeley, Weld County, Colorado.

Said reservoir derives its supply of water, in Water District No. 48, from a branch of Rawah Creek and tributaries thereof entering said stream above the said reservoir. It will be constructed in, upon and across the channel of said branch of Rawah Creek, and has no inlet ditch. It is situate near timber line and at the foot of the snowy range.

Said reservoir is located in Larimer County, Colorado, in the SW¼ of Section 5, Township 8 North, Range 76 West of the 6th P. M. When complete it will have an area at high water line of about 50 acres, will be capable of storing water 30 feet in depth and will have a storage and regulating capacity of 60,984,000 cubic feet.

The said reservoir, along with the remaining thirteen Link Lakes Reservoirs, has a two fold purpose, to-wit:

1st. As an essential part of the Laramie River System of the claimant when used as an expansion or regulating basin for the collection, diversion, control and proper dis-

charge of the waters of Rawah and McIntyre Creeks, into [fol. 2837] and through the said Rawah Creek as a carrier, and through the McIntyre, Rawah and Lower Supply Ditches into the Tunnel Reservoir, for conveyance, expansion, accumulation, control and final discharge through the Laramie River Tunnel and into the Cache la Poudre River for diversion from said stream to the lands of the claimant.

2nd. For use in the usual manner as a storage reservoir for the storage of waters for agricultural and other beneficial uses at times other than those when said reservoir shall be in use as a regulating or expansion basin, and when used for such purposes the said creeks, ditches, reservoir and tunnel shall be used as outlet, carriage and discharge works for said reservoir.

Said reservoir constitutes an essential part, unit or portion of the entire Laramie River System of the claimant, and, when completed, will be used in conjunction with the remaining units or portions of said system in such manner as to give the maximum diversion, collection, storage and carrying capacity to said system and its various units or parts for the irrigation of 125,000 acres of land.

Work was commenced upon this reservoir, along with the several other units or portions of the said Laramie River System of claimant, on or about August 25, 1902, and has since hitherto been prosecuted with diligence by the claimant and its predecessors in title and interest. Owing to the fact that such reservoir is not as yet completed, and no use thereof has been made for the collection, storage or diversion of waters, no findings in behalf of said reservoir can be made, save as to the number and date of its priority, which is hereby fixed as August 25, 1902, and its priority is numbered Reservoir Priority No. 5. Its appropriation shall not exceed a storage depth of 30 feet above the bottom of the outlet tube and a capacity of 60,984,000 cubic feet, [fol. 2838] and in addition thereto, the right to use said reservoir and any and all of its capacity, in conjunction with the other reservoirs and units of said system of irrigation works, and, particularly, the Rawah Ditch, The Rawah & Lower Supply Ditch, the Tunnel Reservoir and the Laramie River Tunnel, for the better regulation of the flow, delivery and discharge of waters through said units to the several carrying and regulating capacities of each thereof,

as more particularly specified in the findings and decree pertinent to each. Said appropriation shall also be limited in said decree to the irrigation of 125,000 acres of land by means of said reservoir and all the other units and portions of said irrigation system of the said claimant.

No. 7—The Link Lake Reservoir No. 3

The claimant of this reservoir is The Greeley-Poudre Irrigation District, a quasi-public or municipal corporation, organized and doing business under the laws of the State of Colorado, whose postoffice address is Greeley, Weld County, Colorado.

Said reservoir derives its supply of water, in Water District No. 48, from a branch of Rawah Creek and tributaries thereof entering said stream above said reservoir. It will be constructed in, upon and across the channel of said branch of Rawah Creek, and has no inlet ditch. It is situate near timber line and at the foot of the snowy range.

Said reservoir is located in Larimer County, Colorado, in the NW¼ of Section 5, Township 8 North, Range 76 West of the 6th P. M. When complete it will have an area at high water line of about 16 acres, will be capable of storing water and regulating the flow thereof to a depth of 30 feet, and will have a storage and regulating capacity of 22,869,000 cubic feet.

[fol. 2839] The said reservoir, along with the remaining thirteen Link Lakes Reservoirs, has a two fold purpose, to-wit:

1st. As an essential part of the Laramie River System of the claimant when used as an expansion or regulating basin for the collection, diversion, control and proper discharge of the waters of Rawah and McIntyre Creeks, into and through the said Rawah Creek as a carrier, and through the McIntyre, Rawah and Lower Supply Ditches into the Tunnel Reservoir, for conveyance, expansion, accumulation, control and final discharge through the Laramie River Tunnel and into the Cache La Poudre River for diversion from said stream to the lands of the claimant.

2nd. For use in the usual manner as a storage reservoir for the storage of waters for agricultural and other beneficial uses at times other than those when said reservoir shall be in use as a regulating or expansion basin, and when

used for such purposes the said creeks, ditches, reservoir and tunnel shall be used as outlet, carriage and discharge works for said reservoir.

Said reservoir constitutes an essential part, unit or portion of the entire Laramie River System of the claimant, and, when completed, will be used in conjunction with the remaining units or portions of said system in such manner as to give the maximum diversion, collection, storage and carrying capacity to said system and its various units or parts for the irrigation of 125,000 acres of land.

Work was commenced upon this reservoir, along with the several other units or portions of the said Laramie River System of claimant, on or about August 25, 1902, and has since hitherto been prosecuted with diligence by the claimant and its predecessors in title and interest. Owing to the [fol. 2840] fact that such reservoir is not as yet completed, and no use thereof has been made for the collection, storage or diversion of waters, no findings in behalf of said reservoir can be made, save as to the number and date of its priority, which is hereby fixed as August 25, 1902, and its priority is numbered Reservoir Priority No. 6. Its appropriation shall not exceed a storage depth of 30 feet above the bottom of the outlet tube and a capacity of 22,869,000 cubic feet, and, in addition thereto, the right to use said reservoir and any or all of its capacity in conjunction with the other reservoir and units of said system of irrigation works, and, particularly, the Rawah Ditch, The Rawah & Lower Supply Ditch, the Tunnel Reservoir and the Laramie River Tunnel, for the better regulation of the flow, delivery and discharge of waters through said units to the several regulating and carrying capacities of each thereof, as more particularly specified in the findings and decree pertinent to each. Said appropriation shall also be limited in said decree to the irrigation of 125,000 acres of land by means of said reservoir and the other units and portions of said irrigation system of the said claimant.

No. 8—The Link Lake Reservoir No. 4

The claimant of this reservoir is The Greeley-Poudre Irrigation District, a quasi-public or municipal corporation, organized and doing business under the laws of the State of Colorado, whose postoffice address is Greeley, Weld County, Colorado.

Said reservoir derives its supply of water, in Water District No. 48, from Rawah Creek and tributaries thereof entering said stream above said reservoir. It will be constructed in, upon and across the channel of said Rawah Creek, and has no inlet ditch. It is situate at the foot of the [fol. 2841] snowy range and near timber line.

Said reservoir is located in Larimer County, Colorado, in the NW¼ of Section 5, Township 8 North, Range 76 West and the SW¼ of Section 32, Township 9 North, Range 76 West of the 6th P. M. When complete it will have an area at high water line of about 20 acres and will be capable of storing and regulating the flow of water to a depth of 25 feet and will have a storage and regulating capacity of 21,780,000 cubic feet.

The said reservoir, along with the remaining thirteen Link Lakes Reservoirs, has a two fold purpose, to-wit:

1st. As an essential part of the Laramie River System of the claimant when used as an expansion or regulating basin for the collection, diversion, control and proper discharge of the waters of Rawah and McIntyre Creeks, into and through the said Rawah Creek as a carrier, and through the McIntyre, Rawah and Lower Supply Ditches into the Tunnel Reservoir, for conveyance, expansion, accumulation, control and final discharge through the Laramie River Tunnel and into the Cache la Poudre River for diversion from said stream to the lands of the claimant.

2nd. For use in the usual manner as a storage reservoir for the storage of waters for agricultural and other beneficial uses at times other than those when said reservoir shall be in use as a regulating or expansion basin, and when used for such purposes the said creeks, ditches, reservoir and tunnel shall be used as outlet, carriage and discharge works for said reservoir.

Said reservoir constitutes an essential part, unit or portion of the entire Laramie River System of the claimant, and, when completed, will be used in conjunction with the remaining units or portions of said system in such manner as to give the maximum diversion, collection, storage and carrying capacity to said system and its various units or parts for the irrigation of 125,000 acres of land.

[fol. 2842] Work was commenced upon this reservoir, along with the several other units or portions of the said

Laramie River System of claimant, on or about August 25, 1902, and has since hitherto been prosecuted with diligence by the claimant and its predecessors in title and interest. Owing to the fact that such reservoir is not as yet completed, and no use thereof has been made for the collection, storage or diversion of waters, no findings in behalf of said reservoir can be made, save as to the number and date of its priority, which is hereby fixed as August 25, 1902, and its priority is numbered Reservoir Priority No. 7. Its appropriation shall not exceed a storage depth of 25 feet above the bottom of the outlet tube and a capacity of 21,780,000 cubic feet, and in addition thereto, the right to use said reservoir and any or all of its capacity in conjunction with the other reservoirs and units of said system of irrigation works, and, particularly, the Rawah Ditch, The Rawah & Lower Supply Ditch, The Tunnel Reservoir and the Laramie River Tunnel, for the better regulation of the flow, delivery and discharge of waters through said units, to the several carrying and regulating capacities of each thereof, as more particularly specified in the findings and decree pertinent to each. Said appropriation shall also be limited in said decree to the irrigation of 125,000 acres of land by means of said reservoir and all the other units and portions of the said irrigation system of said claimant.

[fol. 2843] No. 9—The Link Lake Reservoir No. 5

The claimant of this reservoir is The Greeley-Poudre Irrigation District, a quasi-public or municipal corporation, organized and doing business under the laws of the State of Colorado, whose postoffice address is Greeley, Weld County, Colorado.

Said reservoir derives its supply of water, in Water District No. 48, from a branch of Rawah Creek, and tributaries thereof entering said stream above said reservoir. It will be constructed in, upon and across the channel of said branch of said Rawah Creek and has no inlet ditch. It is situate at the foot of the snowy range and near timber line.

Said reservoir is located in Larimer County, Colorado, in the N½ of Section 5, Township 8 North, Range 76 West of the 6th P. M. When complete it will have an area at high water line of about 20 acres, will be capable of storing water and regulating the flow thereof to a depth of 35 feet

and will have a storage and regulating capacity of 30,942,000 cubic feet.

The said reservoir, along with the remaining thirteen Link Lakes Reservoirs, has a two fold purpose, to-wit:

1st. As an essential part of the Laramie River System of the claimant when used as an expansion or regulating basin for the collection, diversion, control and proper discharge of the waters of Rawah and McIntyre Creeks, into and through the said Rawah Creek as a carrier, and through the McIntyre, Rawah and Lower Supply Ditches into the Tunnel Reservoir, for conveyance, expansion, accumulation, control and final discharge through the Laramie River Tunnel and into the Cache la Poudre River for diversion from said stream to the lands of the claimant.

2nd. For use in the usual manner as a storage reservoir for the storage of waters for agricultural and other beneficial uses at times other than those when said reservoir [fol. 2844] shall be in use as a regulating or expansion basin, and when used for such purposes the said creeks, ditches, reservoir and tunnel shall be used as outlet, carriage and discharge works for said reservoir.

Said reservoir constitutes an essential part, unit or portion of the entire Laramie River System of the claimant, and, when completed, will be used in conjunction with the remaining units or portions of said system in such manner as to give the maximum diversion, collection, storage and carrying capacity to said system and its various units or parts for the irrigation of 125,000 acres of land.

Work was commenced upon this reservoir, along with the several other units or portions of the said Laramie River System of claimant, on or about August 25, 1902, and has since hitherto been prosecuted with diligence by the claimant and its predecessors in title and interest. Owing to the fact that such reservoir is not as yet completed, and no use thereof has been made for the collection, storage or diversion of waters, no findings in behalf of said reservoir can be made, save as to the number and date of its priority, which is hereby fixed as August 25, 1902, and its priority is numbered Reservoir Priority No. 8. Its appropriation shall not exceed a storage depth of 35 feet above the bottom of the outlet tube and a capacity of 30,942,000 cubic feet, and in addition thereto, the right to use said reservoir

and any or all of its capacity, in conjunction with the other reservoirs and units of said system of irrigation works, and, particularly, The Rawah Ditch, and The Rawah & Lower Supply Ditch, the Tunnel Reservoir and the Laramie River Tunnel, for the better regulation of the flow, delivery and discharge of waters through said units, to the several carrying and regulating capacities of each thereof, as more particularly specified in the findings and decree pertinent to each. Said appropriation shall also be [fol. 2845] limited in said decree to the irrigation of 125,000 acres of land by means of said reservoir and all the other units and portions of the said irrigation system of claimant.

No. 10—The Link Lake Reservoir No. 6

The claimant of this reservoir is The Greeley-Poudre Irrigation District, a quasi-public or municipal corporation, organized and doing business under the laws of the State of Colorado, whose postoffice address is Greeley, Weld County, Colorado.

Said reservoir derives its supply of water, in Water District No. 48, from a branch of Rawah Creek and tributaries thereof entering said stream above the said reservoir. It will be constructed in, upon and across the channel of said branch of Rawah Creek, and has no inlet ditch. It is situate near timber line and at the foot of the snowy range.

Said reservoir is located in Larimer County, Colorado, in part on the N½ of Section 5, Township 8 North, Range 76 West, and in part on the SW¼ of Section 32, Township 9 North, Range 76 West of the 6th P. M. When complete it will have an area at high water line of about 12 acres, will be capable of storing water and regulating the flow thereof to a depth of about 25 feet and will have a storage and regulating capacity of about 13,068,000 cubic feet.

The said reservoir, along with the remaining thirteen Link Lakes Reservoirs, has a two-fold purpose, to-wit:

1st. As an essential part of the Laramie River System of the claimant when used as an expansion or regulating basin for the collection, diversion, control and proper discharge of the waters of Rawah and McIntyre Creeks, into and through the said Rawah Creek as a carrier, and through the McIntyre, Rawah and Lower Supply Ditches [fol. 2846] into the Tunnel Reservoir, for conveyance, ex-

pansion, accumulation, control and final discharge through the Laramie River Tunnel and into the Cache la Poudre River for diversion from said stream to the lands of the claimant.

2nd. For use in the usual manner as a storage reservoir for the storage of waters for agricultural and other beneficial uses at times other than those when said reservoir shall be in use as a regulating or expansion basin, and when used for such purposes the said creeks, ditches, reservoir and tunnel shall be used as outlet, carriage and discharge works for said reservoir.

Said reservoir constitutes an essential part, unit or portion of the entire Laramie River System of the claimant, and, when completed, will be used in conjunction with the remaining units or portions of said system in such manner as to give the maximum diversion, collection, storage and carrying capacity to said system and its various units or parts for the irrigation of 125,000 acres of land.

Work was commenced upon this reservoir, along with the several other units or portions of the said Laramie River System of claimant, on or about August 25, 1902, and has since hitherto been prosecuted with diligence by the claimant and its predecessors in title and interest. Owing to the fact that such reservoir is not as yet completed, and no use thereof has been made for the collection, storage or diversion of waters, no findings in behalf of said reservoir can be made, save as to the number and date of its priority, which is hereby fixed as August 25, 1902, and its priority is numbered Reservoir Priority No. 9. Its appropriation shall not exceed a storage depth of 25 feet above the bottom of the outlet tube and a capacity of 13,- [fol. 2847] 068,000 cubic feet, and in addition thereto, the right to use said reservoir and any or all of its capacity, in conjunction with the other reservoirs and units of said system of irrigation works, and, particularly, The Rawah Ditch, and The Rawah & Lower Supply Ditch, the Tunnel Reservoir and the Laramie River Tunnel, for the better regulation of the flow, delivery and discharge of waters through said units, to the several carrying and regulating capacities of each thereof, as more particularly specified in the findings and decree pertinent to each. Said appropriation shall also be limited in said decree to the irrigation of 125,000 acres of land by means of said reservoir and all

the other units and portions of the said irrigation system of claimant.

No. 11—The Link Lake Reservoir No. 7

The claimant of this reservoir is The Greeley-Poudre Irrigation District, a quasi-public or municipal corporation, organized and doing business under the laws of the State of Colorado, whose postoffice address is Greeley, Weld County, Colorado.

Said reservoir derives its supply of water, in Water District No. 48, from a branch of Rawah Creek and tributaries thereof entering said stream above the said reservoir. It will be constructed in, upon and across the channel of said branch of Rawah Creek, and has no inlet ditch. It is situate near timber line and at the foot of the snowy range.

Said reservoir is located in Larimer County, Colorado, in the NE¼ of Section 5, Township 8 North, Range 76 West of the 6th P. M. When complete it will have an area at high water line of about 11 acres, will be capable of storing water and regulating the flow thereof to a depth of about 40 feet and will have a storage and regulating capacity of 19,166,000 cubic feet.

[fol. 2848] The said reservoir, along with the remaining thirteen Link Lakes Reservoirs, has a two fold purpose, to-wit:

1st. As an essential part of the Laramie River System of the claimant when used as an expansion or regulating basin for the collection, diversion, control and proper discharge of the waters of Rawah and McIntyre Creeks, into and through the said Rawah Creek as a carrier, and through the McIntyre, Rawah and Lower Supply Ditches into the Tunnel Reservoir, for conveyance, expansion, accumulation, control and final discharge through the Laramie River Tunnel and into the Cache la Poudre River for diversion from said stream to the lands of claimant.

2nd. For use in the usual manner as a storage reservoir for the storage of waters for agricultural and other beneficial uses at times other than those when said reservoir shall be in use as a regulating or expansion basin, and when used for such purposes the said creeks, ditches, reservoir and tunnel shall be used as outlet, carriage and discharge works for said reservoir.

Said reservoir constitutes and essential part, unit or portion of the entire Laramie River System of the claimant, and, when completed, will be used in conjunction with the remaining units or portions of said system in such manner as to give the maximum diversion, collection, storage and carrying capacity to said system and its various units or parts for the irrigation of 125,000 acres of land.

Work was commenced upon this reservoir, along with the several other units or portions of the said Laramie River System of claimant, on or about August 25, 1902, and has since hitherto been prosecuted with diligence by the claimant and its predecessors in title and interest. Owing to the fact that such reservoir is not as yet completed, and no use thereof has been made for the collection, storage or diversion of waters, no findings in behalf of said reservoir can be made, save as to the number [fol. 2849] and date of its priority, which is hereby fixed as August 25, 1902, and its priority is numbered Reservoir Priority No. 10. Its appropriation shall not exceed a storage depth of 40 feet above the bottom of the outlet tube and a capacity of 19,166,000 cubic feet, and in addition thereto, the right to use said reservoir and any or all of its capacity, in conjunction with the other reservoirs and units of said system of irrigation works, and, particularly, The Rawah Ditch, and The Rawah & Lower Supply Ditch, the Tunnel Reservoir and the Laramie River Tunnel, for the better regulation of the flow, delivery and discharge of waters through said units, to the several carrying and regulating capacities of each thereof, as more particularly specified in the findings and decree pertinent to each. Said appropriation shall also be limited in said decree to the irrigation of 125,000 acres of land by means of said reservoir and all the other units and portions of the said irrigation system of claimant.

No. 12—The Link Lake Reservoir No. 8

The claimant of this reservoir is The Greeley-Poudre Irrigation District, a quasi-public or municipal corporation, organized and doing business under the laws of the State of Colorado, whose postoffice address is Greeley, Weld County, Colorado.

Said reservoir derives its supply of water, in Water District No. 48, from a branch of Rawah Creek and tribu-

taries thereof, entering said stream above the said reservoir. It will be constructed in, upon and across the channel of said branch of Rawah Creek, and has no inlet ditch. It is situate near timber line and at the foot of the snowy range.

[fol. 2850] Said reservoir is located in Larimer County, Colorado, in the S½ of Section 4, Township 8 North, Range 76 West of the 6th P. M. When complete it will have an area at high water line of about 50 acres, will be capable of storing water and regulating the flow thereof to a depth of about 40 feet, and will have a storage and regulating capacity of 87,120,000 cubic feet.

The said reservoir, along with the remaining thirteen Link Lakes Reservoirs, has a two fold purpose, to-wit:

1st. As an essential part of the Laramie River System of the claimant when used as an expansion or regulating basin for the collection, diversion, control and proper discharge of the waters of Rawah and McIntyre Creeks, into and through the said Rawah Creek as a carrier, and through the McIntyre, Rawah and Lower Supply Ditches into the Tunnel Reservoir, for conveyance, expansion, accumulation, control and final discharge through the Laramie River Tunnel and into the Cache la Poudre River for diversion from said stream to the lands of the claimant.

2nd. For use in the usual manner as a storage reservoir for the storage of waters for agricultural and other beneficial uses at times other than those when said reservoir shall be in use as a regulating or expansion basin, and and when used for such purposes the said creeks, ditches, reservoir and tunnel shall be used as outlet, carriage and discharge works for said reservoir.

Said reservoir constitutes an essential part, unit of portion of the entire Laramie River System of the claimant, and, when completed, will be used in conjunction with the remaining units or portions of said system in such manner as to give the maximum diversion, collection, storage and carrying capacity to said system and its various units or parts for the irrigation of 125,000 acres of land.

[fol. 2851] Work was commenced upon this reservoir, along with the several other units or portions of the said Laramie River System of claimant, on or about August 25, 1902, and has since hitherto been prosecuted with diligence by the claimant and its predecessors in title and

interest. Owing to the fact that such reservoir is not as yet completed, and no use thereof has been made for the collection, storage or diversion of waters, no findings in behalf of said reservoir can be made, save as to the number and date of its priority, which is hereby fixed as August 25, 1902, and its priority is numbered Reservoir Priority No. 11. Its appropriation shall not exceed a storage depth of 40 feet above the bottom of the outlet tube and a capacity of 87,120,000 cubic feet, and in addition thereto the right to use said reservoir and any or all of its capacity, in conjunction with the other reservoirs and units of said system of irrigation works, and, particularly, The Rawah Ditch, and The Rawah & Lower Supply Ditch, the Tunnel Reservoir and the Laramie River Tunnel, for the better regulation of the flow, delivery and discharge of waters through said units, to the several carrying and regulating capacities of each thereof, as more particularly specified in the findings and decree pertinent to each. Said appropriation shall also be limited in said decree to the irrigation of 125,000 acres of land by means of said reservoir and all the other units and portions of the said irrigation system of claimant.

No. 13—The Link Lake Reservoir No. 9

The claimant of this reservoir is The Greeley-Poudre Irrigation District, a quasi-public or municipal corporation, organized and doing business under the laws of the State of Colorado, whose postoffice address is Greeley, Weld County, Colorado.

[fol. 2852] Said reservoir derives its supply of water, in Water District No. 48, from a branch of Rawah Creek and tributaries thereof entering said stream above the said reservoir. It will be constructed in, upon and across the channel of said branch of Rawah Creek, and has no inlet ditch. It is situate near timber line and at the foot of the snowy range.

Said reservoir is located in Larimer County, Colorado, in the NE¼ of Section 6, Township 8 North, Range 76 West of the 6th P. M. When complete it will have an area at high water line of about 25 acres, will be capable of storing water and regulating the flow thereof to a depth of 40 feet and will have a storage and regulating capacity of 25,000,000 cubic feet.

The said reservoir, along with the remaining thirteen Link Lakes Reservoirs, has a two fold purpose, to-wit:

1st. As an essential part of the Laramie River System of the claimant when used as an expansion or regulating basin for the collection, diversion, control and proper discharge of the waters of Rawah and McIntyre Creeks, into and through the said Rawah Creek as a carrier, and through the McIntyre, Rawah and Lower Supply Ditches into the Tunnel Reservoir, for conveyance, expansion, accumulation, control and final discharge through the Laramie River Tunnel and into the Cache la Poudre River for diversion from said stream to the lands of the claimant.

2nd. For use in the usual manner as a storage reservoir for the storage of waters for agricultural and other beneficial uses at times other than those when said reservoir shall be in use as a regulating or expansion basin, and when used for such purposes the said creeks, ditches, reservoir and tunnel shall be used as outlet, carriage and discharge works for said reservoir.

[fol. 2853] Said reservoir constitutes an essential part, unit or portion of the entire Laramie River System of the claimant, and, when completed, will be used in conjunction with the remaining units or portions of said system in such manner as to give the maximum diversion, collection, storage, and carrying capacity to said system and its various units or parts for the irrigation of 125,000 acres of land.

Work was commenced upon this reservoir, along with the several other units or portions of the said Laramie River System of claimant, on or about August 25, 1902, and has since hitherto been prosecuted with diligence by the claimant and its predecessors in title and interest. Owing to the fact that such reservoir is not as yet completed, and no use thereof has been made for the collection, storage or diversion of water, no findings in behalf of said reservoir can be made, save as to the number and date of its priority, which is hereby fixed as August 25, 1902, and its priority is numbered Reservoir Priority No. 12. Its appropriation shall not exceed a storage depth of 40 feet above the bottom of the outlet tube and a capacity of 25,000,000 cubic feet, and in addition thereto, the right to use said reservoir and any or all of its capacity, in conjunction with the other reservoirs and units of said system of irri-

gation works, and, particularly, The Rawah Ditch, and The Rawah & Lower Supply Ditch, the Tunnel Reservoir and the Laramie River Tunnel, for the better regulation of the flow, delivery and discharge of waters through said units, to the several carrying and regulating capacities of each thereof, as more particularly specified in the findings and decree pertinent to each. Said appropriation shall also be limited in said decree to the irrigation of 125,000 acres of land by means of said reservoir and all the other units and portions of the said irrigation system of claimant.

[fol. 2854] No. 14—The Link Lake Reservoir No. 10

The claimant of this reservoir is The Greeley-Poudre Irrigation District, a quasi-public or municipal corporation, organized and doing business under the laws of the State of Colorado, whose postoffice address is Greeley, Weld County, Colorado.

Said reservoir derives its supply of water, in Water District No. 48, from McIntyre Creek and tributaries thereof entering said stream above said reservoir. It will be constructed in, upon and across the channel of said McIntyre Creek and will have no inlet ditch. It is situate at the foot of the snowy range and at timber line.

Said reservoir is located in Larimer County, Colorado, in the NE¼ of Section 31, Township 9 North, Range 76 West of the 6th P. M. When complete it will have an area at high water line of about 14 acres, will be capable of storing water and regulating the flow thereof to a depth of 30 feet and will have a storage and regulating capacity of 18,500,000 cubic feet.

The said reservoir, along with the remaining thirteen Link Lake Reservoirs, has a two fold purpose:

1st. As an essential part of the Laramie River System of the claimant when used as an expansion or regulating basin for the collection, diversion, control and proper discharge of the waters of Rawah and McIntyre Creeks, into and through the said Rawah Creek as a carrier, and through the McIntyre, Rawah and Lower Supply Ditches into the Tunnel Reservoir, for conveyance, expansion, accumulation control and final discharge through the Laramie River Tunnel and into the Cache la Poudre River for diversion from said stream to the lands of the claimant.

2nd. For use in the usual manner as a storage reservoir for the storage of waters for agricultural and other beneficial uses at times other than those when said reservoir [fol. 2855] shall be in use as a regulating or expansion basin, and when used for such purposes the said creeks, ditches, reservoir and tunnel shall be used as outlet, carriage and discharge works for said reservoir.

Said reservoir constitutes an essential part, unit or portion of the entire Laramie River System of the claimant, and, when completed, will be used in conjunction with the remaining units or portions of said system in such manner as to give the maximum diversion, collection, storage and carrying capacity to said system and its various units or parts for the irrigation of 125,000 acres of land.

Work was commenced upon this reservoir, along with the several other units or portions of the said Laramie River System of claimant, on or about August 25, 1902, and has since hitherto been prosecuted with diligence by the claimant and its predecessors in title and interest. Owing to the fact that such reservoir is not as yet completed, and no use thereof has been made for the collection, storage or diversion of waters, no findings in behalf of said reservoir can be made, save as to the number and date of its priority, which is hereby fixed as August 25, 1902, and its priority is numbered Reservoir Priority No. 13. Its appropriation shall not exceed a storage depth of 30 feet above the bottom of the outlet tube, and a storage capacity of 18,500,000 cubic feet, and, in addition thereto, the right to use said reservoir and any or all of its capacity in conjunction with the other reservoirs and units of said system of irrigation works, and, particularly, the McIntyre Ditch, The Rawah Ditch, and The Rawah & Lower Supply Ditch, the Tunnel Reservoir and the Laramie River Tunnel, for the better regulation of the flow, delivery and discharge of waters through said units, to the several carrying and regulating capacities of each thereof, as more particularly specified in the findings and decree pertinent to each. Said ap- [fol. 2856] propriation shall also be limited in said decree to the irrigation of 125,000 acres of land by means of said reservoir and all the other units and portions of the said irrigation system of claimant.

No. 15—The Link Lake Reservoir No. 11

The claimant of this reservoir is The Greeley-Poudre Irrigation District, a quasi-public or municipal corporation, organized and doing business under the laws of the State of Colorado, whose postoffice address is Greeley, Weld County, Colorado.

Said reservoir derives its supply of water, in Water District No. 48, from McIntyre Creek and tributaries thereof entering said stream above said reservoir. It will be constructed in, upon and across the channel of said McIntyre Creek and will have no inlet ditch. It is situate at the foot of the snowy range and at timber line.

Said reservoir is located in Larimer County, Colorado, in the SW¼ of Section 31, Township 9 North, Range 76 West of the 6th P. M. When complete it will have an area at high water line of 35 acres, will be capable of storing water and regulating the flow thereof to a depth of 35 feet and will have a storage and regulating capacity of about 50,000,000 cubic feet.

The said reservoir, along with the remaining thirteen Link Lakes Reservoirs, has a two fold purpose, to-wit:

1st. As an essential part of the Laramie River System of the claimant when used as an expansion or regulating basin for the collection, diversion, control and proper discharge of the waters of Rawah and McIntyre Creeks, into and through the said Rawah Creek as a carrier, and through the McIntyre, Rawah and Lower Supply Ditches into the Tunnel Reservoir, for conveyance, expansion, accumulation, control and final discharge through the Laramie River [fol. 2857] Tunnel and into the Cache la Poudre River for diversion from said stream to the lands of the claimant.

2nd. For use in the usual manner as a storage reservoir for the storage of waters for agricultural and other beneficial uses at times other than those when said reservoir shall be in use as a regulating or expansion basin, and when used for such purposes the said creeks, ditches, reservoir and tunnel shall be used as outlet, carriage and discharge works for said reservoir.

Said reservoir constitutes an essential part, unit or portion of the entire Laramie River System of the claimant, and, when completed, will be used in conjunction with the

remaining units or portions of said system in such manner as to give the maximum diversion, collection, storage and carrying capacity to said system and its various units or parts for the irrigation of 125,000 acres of land.

Work was commenced upon this reservoir, along with the several other units or portions of the said Laramie River System of claimant, on or about August 25, 1902, and has since hitherto been prosecuted with diligence by the claimant and its predecessors in title and interest. Owing to the fact that such reservoir is not as yet completed, and no use thereof has been made for the collection, storage or diversion of waters, no findings in behalf of said reservoir can be made, save as to the number and date of its priority, which is hereby fixed at August 25, 1902, and its priority is numbered Reservoir Priority No. 14. Its appropriation shall not exceed a storage depth of 35 feet above the bottom of the outlet tube, and a storage capacity of 50,000,000 cubic feet, and, in addition thereto, the right to use said reservoir and any or all of its capacity [fol. 2858] in conjunction with the other reservoirs and units of said system of irrigation works, and, particularly, the McIntyre Ditch, The Rawah Ditch, and The Rawah & Lower Supply Ditch, the Tunnel Reservoir and the Laramie River Tunnel, for the better regulation of the flow, delivery and discharge of waters through said units, to the several carrying and regulating capacities of each thereof, as more particularly specified in the findings and decree pertinent to each. Said appropriation shall also be limited in said decree to the irrigation of 125,000 acres of land by means of said reservoir and all the other units and portions of the said irrigation system of claimant.

No. 16—The Link Lake Reservoir No. 12

The claimant of this reservoir is The Greeley-Poudre Irrigation District, a quasi-public or municipal corporation, organized and doing business under the laws of the State of Colorado, whose postoffice address is Greeley, Weld County, Colorado.

Said reservoir derives its supply of water, in Water District No. 48, from a branch of Rawah Creek and tributaries thereof entering said stream above the said reservoir. It will be constructed in, upon and across the channel of said

branch of Rawah Creek, and has no inlet ditch. It is situate near timber line and at the foot of the snowy range.

Said reservoir is located in Larimer County, Colorado, in the NW¼ of Section 4, Township 8 North, Range 76 West of the 6th P. M. When complete it will have an area at high water line of 14 acres, will be capable of storing water and regulating the flow thereof to a depth of 10 feet and will have a storage and regulating capacity of about 6,000,000 cubic feet. This reservior is sometimes known as "Camp Lake."

[fol. 2859] The said reservoir, along with the remaining thirteen Link Lakes Reservoirs, has a two fold purpose, to-wit:

1st. As an essential part of the Laramie River System of the claimant when used as an expansion or regulating basin for the collection, control and proper discharge of the waters of Rawah and McIntyre Creeks, into and through the said Rawah Creek as a carrier, and through the McIntyre, Rawah and Lower Supply Ditches into the Tunnel Reservoir, for conveyance, expansion, accumulation, control and final discharge through the Laramie River Tunnel and into the Cache la Poudre River for diversion from said stream to the lands of the claimant.

2nd. For use in the usual manner as a storage reservoir for the storage of waters for agricultural and other beneficial uses at times other than those when said reservoir shall be in use as a regulating or expansion basin, and when used for such purposes the said creeks, ditches, reservoir and tunnel shall be used as outlet, carriage and discharge works for said reservoir.

Said reservoir constitutes an essential part, unit or portion of the entire Laramie River System of the claimant, and, when completed, will be used in conjunction with the remaining units or portions of said system in such manner as to give the maximum diversion, collection, storage and carrying capacity to said system and its various units or parts for the irrigation of 125,000 acres of land.

Work was commenced upon this reservoir, along with the several other units or portions of the said Laramie River System of claimant, on or about August 25, 1902, and has since hitherto been prosecuted with diligence by the claimant and its predecessors in title and interest. Owing

to the fact that such reservoir is not as yet completed, and no use thereof has been made for the collection, storage [fol. 2860] or diversion of waters, no findings in behalf of said reservoir can be made, save as to the number and date of its priority, which is hereby fixed as August 25, 1902, and its priority is numbered Reservoir Priority No. 15. Its appropriation shall not exceed a storage depth of 10 feet above the bottom of the outlet tube and a capacity of 6,000,000 cubic feet, and in addition thereto the right to use said reservoir and any or all of its capacity, in conjunction with the other reservoirs and units of said system of irrigation works, and, particularly, The Rawah & Lower Supply Ditch, the Tunnel Reservoir and the Laramie River Tunnel, for the better regulation of the flow, delivery and discharge of waters through said units, to the several carrying and regulating capacities of each thereof, as more particularly specified in the findings and decree pertinent to each. Said appropriation shall also be limited in said decree to the irrigation of 125,000 acres of land by means of said reservoir and all the other units and portions of the said irrigation system of claimant.

No. 17—The Link Lake Reservoir No. 13

The claimant of this reservoir is The Greeley-Poudre Irrigation District, a quasi-public or municipal corporation, organized and doing business under the laws of the State of Colorado, whose postoffice address is Greeley, Weld County, Colorado.

Said reservoir derives its supply of water, in Water District No. 48, from a branch of Rawah Creek and tributaries thereof entering said stream above the said reservoir. It will be constructed in, upon and across the channel of said [fol. 2861] branch of Rawah Creek, and has no inlet ditch. It is situate near timber line and at the foot of the snowy range.

Said reservoir is located in Larimer County, Colorado, in the NE¼ of Section 29, Township 9 North, Range 76 West of the 6th P. M. When complete it will have an area at high water line of 60 acres and will be capable of storing water and regulating the flow thereof to a depth of 10 feet and will have a storage and regulating capacity of about 26,000,000 cubic feet.

The said reservoir, along with the remaining thirteen Link Lakes Reservoirs, has a two fold purpose, to-wit:

1st. As an essential part of the Laramie River System of the claimand when used as an expansion or regulating basin for the collection, diversion, control and proper discharge of the waters of Rawah and McIntyre Creeks, into and through the said Rawah Creek as a carrier, and through the McIntyre, Rawah and Lower Supply Ditches into the Tunnel Reservoir, for conveyance, expansion, accumulation, control and final discharge through the Laramie River Tunnel and into the Cache la Poudre River for diversion from said stream to the lands of the claimant.

2nd. For use in the usual manner as a storage reservoir for the storage of waters for agricultural and other beneficial uses at times other than those when said reservoir shall be in use as a regulating or expansion basin, and when used for such purposes the said creeks, ditches, reservoir and tunnel shall be used as outlet, carriage and discharge works for said reservoir.

Said reservoir constitutes an essential part, unit, or portion of the entire Laramie River System of the claimant, and, when completed, will be used in conjunction with the remaining units or portions of said system in such manner as to give the maximum diversion, collection, storage and carrying capacity to said system and its various units or [fol. 2862] parts for the irrigation of 120,000 acres of land.

Work was commenced upon this reservoir, along with the several other units or portions of the said Laramie River System of claimant, on or about August 25, 1902, and has since hitherto been prosecuted with diligence by the claimant and its predecessors in title and interest. Owing to the fact that such reservoir is not as yet completed, and no use thereof has been made for the collection, storage or diversion of waters, no findings in behalf of said reservoir can be made, save as to the number and date of its priority, which is hereby fixed as August 25, 1902, and its priority is numbered Reservoir Priority No. 16. Its appropriation shall not exceed a storage depth of 10 feet above the bottom of the outlet tube and a capacity of 26,000,000 cubic feet, and in addition thereto, the right to use said reservoir and any or all of its capacity, in conjunction with the other reservoirs and units of said system of irrigation works,

and, particularly, The Rawah & Lower Supply Ditch, the Tunnel Reservoir and the Laramie River Tunnel, for the better regulation of the flow, delivery and discharge of waters through said units, to the several carrying and regulating capacities of each thereof, as more particularly specified in the findings and decree pertinent to each. Said appropriation shall also be limited in said decree to the irrigation of 125,000 acres of land by means of said reservoir and all the other units and portions of the said irrigation system of claimant.

[fol. 2863] No. 18—The Link Lake Reservoir No. 14

The claimant of this reservoir is The Greeley-Poudre Irrigation District, a quasi-public or municipal corporation, organized and doing business under the laws of the State of Colorado, whose postoffice address is Greeley, Weld County, Colorado.

Said reservoir derives its supply of water, in Water District No. 48, from Spring Creek, a branch and tributary of Rawah Creek, and tributaries of said Spring Creek entering said stream above said reservoir. It will be constructed in, upon and across the channel of said Spring Creek and has no inlet ditch.

Said reservoir is located in Larimer County, Colorado, in the NE¼ of Section 29, Township 9 North, Range 76 West of the 6th P. M. When complete it will have an area at high water line of about 50 acres, will be capable of storing water and regulating the flow thereof to a depth of 21 feet and will have a storage and regulating capacity of about 26,000,000 cubic feet.

The said reservoir, along with the remaining thirteen Link Lakes Reservoirs, has a two fold purpose, to-wit:

1st. As an essential part of the Laramie River System of the claimant when used as an expansion or regulating basin for the collection, diversion, control and proper discharge of the waters of Rawah and McIntyre Creeks, into and through the said Rawah Creek as a carrier, and through the McIntyre, Rawah and Lower Supply Ditches into the Tunnel Reservoir, for conveyance, expansion, accumulation, control and final discharge through the Laramie River Tunnel and into the Cache la Poudre River for diversion from said stream to the lands of the claimant.

2nd. For use in the usual manner as a storage reservoir for the storage of waters for agricultural and other beneficial uses at times other than those when said reservoir [fol. 2864] shall be in use as a regulating or expansion basin, and when used for such purposes the said creeks, ditches, reservoir and tunnel shall be used as outlet, carriage and discharge works for said reservoir.

Said reservoir constitutes an essential part, unit or portion of the entire Laramie River System of the claimant, and, when completed, will be used in conjunction with the remaining units or portions of said system in such manner as to give the maximum diversion, collection, storage and carrying capacity to said system and its various units or parts for the irrigation of 125,000 acres of land.

Work was commenced upon this reservoir, along with the several other units or portions of the said Laramie River System of claimant, on or about August 25, 1902, and has since hitherto been prosecuted with diligence by the claimant and its predecessors in title and interest. Owing to the fact that such reservoir is not as yet completed, and no use thereof has been made for the collection, storage or diversion of waters, no findings in behalf of said reservoir can be made, save as to the number and date of its priority, which is hereby fixed as August 25, 1902, and its priority is numbered Reservoir Priority No. 17. Its appropriation shall not exceed a storage depth of 12 feet above the bottom of the outlet tube and capacity of 26,000,000 cubic feet, and in addition thereto, the right to use said reservoir and any or all of its capacity, in conjunction with the other reservoirs and units of said system of irrigation works, and, particularly, The Rawah & Lower Supply Ditch, the Tunnel Reservoir and the Laramie River Tunnel, for the better regulation of the flow, delivery and discharge of waters through said units, to the several carrying and regulating capacities of each thereof, as more particularly specified in the findings and decree pertinent [fol. 2865] to each. Said appropriation shall also be limited in said decree to the irrigation of 125,000 acres of land by means of said reservoir and all the other units and portions of the said irrigation system of claimant.

No. 19—The Tunnel Reservoir of the Laramie River System

The claimant of this reservoir is The Greeley-Poudre Irrigation District, a quasi-public or municipal corporation, organized and doing business under the laws of the State of Colorado, whose postoffice address is Greeley, Weld County, Colorado.

Water is received into said reservoir from the Laramie River and the West Fork of the Laramie River, also, from McIntyre, Rawah, West Springer, Rapid, Winifred, Fall, Mill, Deadman, Nunn, Porter, Brinker, East Springer, Half Mile and various other creeks tributary to the Laramie River below the mouth of the West Fork and from the various tributaries of each of said streams entering the Laramie River and the West Fork of the Laramie River above the Tunnel Reservoir or said other streams above the lines of The Lower Rawah & Supply and the Deadman and Nunn Creek Ditches. Said reservoir is in process of construction, in, upon and across the channel of the Laramie River immediately below the mouth of the West Fork of the Laramie River.

Said reservoir, insofar as the collection, accumulation, storage, diversion and carriage of the waters of the Laramie River and West Fork of the Laramie River and all tributaries of either thereof, above and southerly from the dam of said reservoir, has no inlet ditch, each of said streams serving as an inlet for the carriage of water to and into said reservoir. The Rawah Ditch, The Rawah & Lower Supply Ditch and The Deadman and Nunn Creek [fol. 2866] Ditch severally and collectively serve as inlets to said reservoir, for the purpose of diverting waters from the various creeks by said ditches intersected and conveying the same to and into said reservoir, as will more particularly appear in the findings and decree herein pertinent to said ditches.

Said reservoir is located in Larimer County, Colorado, in Sections Six (6) and Seven (7), Township Eight (8) North, Range Seventy-five (75) West of the 6th P. M., and Section One (1), Township Eight (8) North, Range Seventy-six (76) West of the 6th P. M. When complete it will have an area at high water line of about 217 acres and will be capable of storing and regulating the flow of water to a

depth of 33 feet and will have a storage and regulating capacity of 170,000,000 cubic feet. It is an essential unit or part of the entire collection, storage, diversion and carriage system of irrigation works of the claimant for the collection, diversion, control, temporary accumulation and proper discharge of the waters of the Laramie River and its several tributaries diverted and controlled by said system, and finally discharged and conveyed through the Laramie River Tunnel. The said reservoir is located at the west portal of said tunnel and will be used as an equalization or expansion basin, for the regulation of the flow of the waters of the Laramie River, or the West Fork of the Laramie River, and the waters delivered and diverted thereinto by the several other units of the system, and, particularly, the three collection ditches aforesaid, to, into and through the said Laramie River Tunnel, so as to obtain the greatest diversion, use and benefit of the flow and discharge of waters [fol. 2867] from the said irrigation works of the claimant. It constitutes the general and final equalizing and regulating basin and receptacle of all of the waters collected, diverted, stored, discharged and carried through the irrigation system of the claimant upon the Laramie River, save and except the diversion made by the Laramie River Tunnel when operated as a separate unit, and the quantity of water in said reservoir will increase and decrease from time to time with the delivery of water into and discharge through the Laramie River Tunnel, from said reservoir. It will be used in conjunction with the remaining units or portions of said system for the irrigation of 125,000 acres of land.

No separate priority will be awarded said reservoir, but, owing to the functions which it will perform, it will be considered as a unit or part of the entire Laramie River System of the claimant and its priority shall be considered as merged into the priority and appropriation of the Laramie River Tunnel as well as of the remainder of said system of works, and when considered as such unit or part of said system it shall never be used to exceed a storage depth of 33 feet above the bottom of the outlet tube and a capacity of 170,000,000 cubic feet, with the right to use any or all of its capacity from time to time and throughout the year in conjunction with the other reservoirs and units of said system of irrigation works, for the better regulation of the flow, delivery and discharge of water through the several

units, or any thereof, to the several carrying and regulating capacities of each thereof, as more particularly specified in the findings and decree pertinent to each of such units, in such manner as to obtain from said system and each of the units the maximum efficiency and maximum collection, diversion, storage, carriage and discharge capacity for the [fol. 2868] irrigation of 125,000 acres of land.

No. 20—The Laramie River Reservoir

The claimant of this reservoir is The Greeley-Poudre Irrigation District, a quasi-public or municipal corporation, organized and doing business under the laws of the State of Colorado, whose postoffice address is Greeley, Weld County, Colorado.

Said reservoir derives its supply of water, in Water District No. 48, from the Laramie River and all tributaries thereof entering said stream above the location of the dam of said reservoir. It will be constructed in, upon and across the channel of the Laramie River and has no inlet ditch.

It is located in Larimer County, Colorado, on portions of Sections One (1), Two (2), Three (3), Eleven (11), Twelve (12) and Fourteen (14), Township Nine (9) North, Range Seventy-six (76) West and in small part upon Section Thirty-five (35), Township Ten (10) North, of Range Seventy-six (76) West of the 6th P. M. When complete it will have an area at high water line of about 1200 acres, will be capable of storing water 80 feet in depth and will have a storage capacity of 1,940,000,000 cubic feet. It will be completed and used for the storage of water for irrigation purposes and, also, for the regulation of the flow of water in the Laramie River, for the purpose of supplying the needs of all appropriators below its outlet, as well as for supplying water for the irrigation of the lands of claimant situate in the valley of the Laramie River northerly from said reservoir. When used for the purpose of regula- [fol. 2869] tion of flow, the water therein stored will be at times used to make up temporary shortages or deficiencies, if any, in the flow of the stream. Work was commenced by survey on this reservoir on or about the 6th day of April, A. D. 1908, and was thereafter prosecuted with due diligence in connection with other surveys and construction upon the various works of the claimant. The site of said reservoir,

save that portion situate upon government lands, has been acquired by the claimant and its predecessors. Actual construction upon the dam of said reservoir has been prevented owing to failure of the claimant and its predecessors to obtain right of way and easement from the United States for the location of the dam upon portions of Section Thirty-five (35). Owing to the fact that the reservoir is not as yet complete and no use thereof has been made for the storage or diversion of water, no findings in behalf of said reservoir can be made, save as to the number and date of its priority, which is hereby fixed as April 6, A. D. 1908, and its priority is numbered Reservoir No. 18. Its appropriation shall not exceed a storage depth of 80 feet above the bottom of its outlet tube and a capacity of 1,940,000,000 cubic feet.

[fol. 2870] IN THE DISTRICT COURT

STATE OF COLORADO,
County of Larimer, ss:

In the Matter of the Adjudication of the Priority of Right to the Use of Water for Irrigation in Water District No. 48, State of Colorado

Decree

Now on this 20th day of February. A. D. 1914, this matter coming on for a final hearing and adjudication upon the report of L. R. Temple, Referee appointed herein, to whom this matter was by order of this Court, herein entered on the 7th day of October, A. D. 1910, referred for the purposes in said order mentioned as well upon the several findings upon the evidence produced in this matter, as upon the said evidence taken by and before said referee, and the Court being satisfied, from the several returns of notices, certificates of publication, affidavits and certificates of said Referee, respectively, that the said testimony returned, and upon which the findings herein returned have severally been made, was taken upon due and lawful notice, in all respects according to the provisions of the statute in such case made and provided and the rules and several orders of this Court in that behalf in this matter made and entered; and further that the notice of the time set for filing exceptions in this matter to the report and findings, and of the time set for final hearing thereof and this cause, having duly served on all the parties entitled to notice under the order

of this Court in that behalf entered, in manner and form as by said order required; and further, that all interested in this matter and entitled to notice in any stage of the pro-
[fol. 2871] ceedings herein, have at all times been duly notified according to law and order of this Court; and the report of the said referee, together with the returns of service of notices, affidavits, abstract and findings, being found in due form, and the Court having now here in open Court heard all parties and their attorneys so far as they desired to be heard, respectively, touching the several matters herein, it is by the Court, in consideration of the premises, hereby ordered and adjudged that the several findings of the said referee, as reported to and filed in this Court, be in all things approved and confirmed, and that they be taken, deemed and held in all respects as the findings of this Court in this matter.

Subject, however, to the following next mentioned provisions, to-wit:

No. 1. No part of this decree shall in any case be taken, deemed or held to confirm, impair or in any manner affect any claim of right or property held or claimed by any person, or any part thereof, or the land or any part thereof on which any such ditch, canal or reservoir may be situated, or the land held or claimed as a right of way of any of them, or any right, interest or claim of property whatever, in or relating to any of them.

No. 2. No part of this decree shall be taken, deemed or held as affecting in any manner any question or claim of right between the owners or claimants of any such ditch, canal or reservoir, as between each other, whether as part owners or shareholders therein, or as stockholders in any corporation or joint stock company claiming or to claim the same or any part thereof, nor shall it affect the rights, interests or claims of any consumers of water for irrigation
[fol. 2872] or domestic purposes, whether as part owner, lessee, shareholders or stockholder in any corporation holding or controlling the same, or as purchasers of water therefrom, as against the rights, interests or claims of any other party or parties interested or claiming interest or rights in or to such ditch, canal or reservoir as owner, lessee or part owner thereof, or as shareholder or stockholder in any corporation claiming the same or as purchaser of water therefrom. Neither shall it affect any claim of priority

made or resisted as between parties using water for said ditch, canal or reservoir, as to such water.

3. No part of this decree shall in any manner affect any question between two or more parties claiming or owning priorities as herein adjudged, on the same stream, in any case where the water in such stream sinks and rises to the surface again between the locations of the headgates of their respective ditches or canals, or in any dispute as to the identity of the water appropriated by either party or of such sinking and rising stream.

4. This decree shall not affect any question of priority between claimants or owners of ditches or canals used in whole or in part for milling or manufacturing or water power for other purposes as to any water carried in such ditches or canals for said purposes.

5. This decree shall not affect any claim, interest or right of any corporation as to the right of property in any ditch, canal or reservoir, or the ground on which the same may be situated, or any question which may arise between the stockholders thereof or between them and the State, people or any party, upon the dissolution of such corporation by expiration of its charter or otherwise, as to any ap- [fol. 2873] propriation of water or rights secured by condemnation proceeding by such corporation during its legal existence.

6. No part of this decree shall affect in any way any right, claim or interest now or hereafter held or claimed to any appropriation of water made after the closing of the testimony touching the construction or enlargements of the ditch, canal or reservoir by means of which such appropriation may have been made.

7. No part of this decree shall be taken, deemed, or held as adjudging to any claimant or present or future representative of any claim to any ditch or canal or reservoir, or party holding, using or controlling the same, any right to take and carry by means of any ditch, canal or reservoir herein mentioned, or by virtue of any appropriation herein adjudged, any water from any natural stream except to be applied to the use for which such appropriation has been made; nor to allow any excessive use or waste of water whatever; nor to allow any diversion of water ex-

cept for lawful and beneficial uses and in no event shall the appropriations awarded priorities for irrigation of lands within Water District No. 48 be used to irrigate any acreage in excess of that fixed in this decree.

8. This decree shall be taken, deemed and held as intended to determine and establish the several priorities of right by appropriation of water from the streams of said Water District No. 48, for irrigation, of the several ditches, canals and reservoirs in said District, concerning which testimony has been offered in this matter, each according to the construction, enlargement or extension thereof, with the amount of water held to have been appropriated thereby.

All priorities first awarded in this decree which are adjudged to have taken effect on the same date are of equal [fol. 2874] seniority as to each other, regardless of the different numbers that may have been given in this decree. Dates of taking effect of appropriations shall control rather than numbers fixed to the priorities, with the exception that all agricultural appropriations herein decreed priorities are subject to the lowest priority awarded in Decree in this matter entered October 11, 1906.

9. No part of this decree shall be taken, deemed or held as adjudging to any claimant or present or future representative of any claim to any ditch, canal, reservoir using water for irrigation of lands situate in the Laramie River Valley within Water District No. 48, or party holding, using or controlling the same, any right, to the use of water for a period in excess of 75 days in each and every year, and such period is hereby fixed as beginning not earlier than the 15th day of May, and ending not later than the 1st day of August, of each year.

Subject to the several last mentioned nine provisions, it is further, as to said ditches, canals, and reservoirs, and the several appropriations of water by means of them respectively claimed in this matter, ordered, adjudged and decreed as in and by the findings of said Referee is found, as follows:

That said ditches be, and the same are hereby, numbered according to the date of their several and respective constructions, and said dates are hereby determined and declared to be as follows:

[fol. 2875]

Ditch No.	Name of Ditch	Date Appropriation	Priority No.
65	John Goetz Ditch No. 1	June 1, 1879	60
62	Ollie Ditch	June 1, 1886	61
77	Upper Hills Ditch	May 1, 1887	62
82	Stuart Ditch	April 15, 1896	63
63	La Garde Ditch Enlargement	June 1, 1896	64
64	Jimmy Creek Ditch Enlargement	June 2, 1896	65
84	Link Ditch No. 2 Enlargement	June 15, 1896	66
55	Brinker Creek Ditch	July 10, 1901	67
79	Mansfield Ditch Enlargement	April 1, 1902	68
80	Mansfield Ditch No. 2, Enlg	April 15, 1902	69
56	Pine Creek Ditch	Aug. 20, 1902	70
72	Rawah Ditch	Aug. 25, 1902	71*
73	Rawah & Lower Supply Ditch	Aug. 25, 1902	72*
74	McIntyre Ditch	Aug. 25, 1902	73*
75	Dead Man & Nunn Creek Ditch	Aug. 25, 1902	74*
76	Laramie River Tunnel	Aug. 25, 1902	75*
59	Nellie Ditch	Sept. 10, 1903	76
60	Timothy Ditch	June 5, 1904	77
81	Mansfield Ditch No. 3	Sept. 1, 1904	78*
70	Detro Ditch No. 2	Jan. 16, 1906	79
61	Grace Creek Ditch No. 2 Enlargement	Apr. 1, 1907	80
58	McIntyre Ditch	July 25, 1908	81
69	Thompson Ditch	May 26, 1909	82
66	John Goetz Ditch No. 2	June 9, 1909	83
67	Shell Creek Ditch	June 10, 1909	84
68	Dry Creek Ditch	June 11, 1909	85

Note: * after a priority number indicates that the decree for the appropriation is conditional or provisional and not final.

[fol. 2876]

Ditch No.	Name of Ditch	Date Appropriation	Priority No.
78	Martin Ditch No. 2, Enlargement and Extension	May 25, 1910	86
57	Pine Creek Ditch Extension	July 8, 1911	87
71	Stubb Creek Ditch	July 28, 1911	88
83	Stuart Ditch No. 2	May 24, 1913	89*

Reservoirs

Reservoir No.	Name of Reservoir		
4	Johnson Reservoir	June 1, 1897	3
5	Link Lake Reservoir No. 1	Aug. 25, 1902	4*
6	Link Lake Reservoir No. 2	Aug. 25, 1902	5*
7	Link Lake Reservoir No. 3	Aug. 25, 1902	6*
8	Link Lake Reservoir No. 4	Aug. 25, 1902	7*
9	Link Lake Reservoir No. 5	Aug. 25, 1902	8*
10	Link Lake Reservoir No. 6	Aug. 25, 1902	9*
11	Link Lake Reservoir No. 7	Aug. 25, 1902	10*
12	Link Lake Reservoir No. 8	Aug. 25, 1902	11*
13	Link Lake Reservoir No. 9	Aug. 25, 1902	12*
14	Link Lake Reservoir No. 10	Aug. 25, 1902	13*
15	Link Lake Reservoir No. 11	Aug. 25, 1902	14*
16	Link Lake Reservoir No. 12	Aug. 25, 1902	15*
17	Link Lake Reservoir No. 13	Aug. 25, 1902	16*
18	Link Lake Reservoir No. 14	Aug. 25, 1902	17*
19	The Tunnel Reservoir	No date	Decree denied
20	Laramie River Reservoir	April 6, 1908	18*
3	Wears Ditch and Reservoir	Oct. 15, 1908	19

Note: * after a priority number indicates that the decree for the appropriation is conditional or provisional and not final.

[fol. 2877] No. 55—The Brinker Creek Ditch

This ditch, numbered 55, named The Brinker Creek Ditch, Watson Zeigler, George A. Webb and S. E. Eddy, claimants, is a ditch constructed and used for the irrigation of 40 acres of land; it draws its supply of water from Brinker Creek with its headgate located at a point in the Southwest Quarter (SW¼) of the Southeast Quarter (SE¼) of Section Twenty four (24) Township Nine (9) North, Range 76, whence the southeast corner of Section 24 bears east 68 degrees and 10 minutes 1374 feet, and entitled by appropriation to use of water from said stream to Priority No. 67., by construction thereof and thereby to the quantity of water with the number and date of the priority of appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream for the use and benefit aforesaid under and by virtue of said appropriation by construction, Priority No. 67, eight cubic feet of water per second of time, or so much thereof as may be necessary to irrigate forty acres of land, the appropriation of which water took effect on, and said priority dates from the 10th day of July, 1901, but said date is limited as set forth in the findings for said ditch herein, and in paragraph 8 of this decree.

[fol. 2878] No. 56—The Pine Creek Ditch

That ditch numbered 56, named the Pine Creek Ditch, Samuel O. Shipp claimant, is a ditch constructed and used for the irrigation of 75 acres of land; it draws its supply of water from Pine Creek with its headgate located at a point which bears south 49 degrees, 22 minutes west 2562 feet from the quarter corner of the east side of Section 20, Township 10, N. Range 76 W., and entitled by appropriation to use of water from said stream to Priority No. 70, by construction thereof and thereby to the quantity of water, with the number and date of the priority of appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto, it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream for the use

and benefit aforesaid under and by virtue of said appropriation by construction, Priority No. 70, four cubic feet of water per second of time, or so much thereof as may be necessary to irrigate 75 acres of land, the appropriation of which water took effect on, and said priority dates from the 20th day of August, 1902.

No. 57—The Pine Creek Ditch Extension

That ditch numbered 57, named the Pine Creek Ditch Extension, Samuel O. Shipp, R. E. Moan and J. F. Moan, claimants, is a ditch constructed and used for the irrigation of 60 acres of land; it draws its supply of water from Pine Creek with its headgate identical with the headgate of the Pine Creek Ditch, to-wit, at a point which bears south [fol. 2879] 49 degrees, 22 minutes west 2562 feet from the quarter corner on the east side of Section 20, Township 10, N. Range 76 West, and is an extension of the said, The Pine Creek Ditch, and entitled by appropriation to use of water from said stream to Priority No. 87, by construction thereof and thereby to the quantity of water with the number and date of the priority of appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream for the use and benefit aforesaid under and by virtue of said appropriation by construction, Priority No. 87, 1.75 cubic feet of water per second of time, or so much thereof as may be necessary to irrigate 60 acres of land, the appropriation of which water took effect on, and said priority dates from the 8th day of July, 1911.

No. 58—The McIntyre Ditch

That ditch numbered 58, named the McIntyre Ditch, R. E. Moan, J. F. Moan and Samuel O. Shipp, claimants, is a ditch constructed and used for the irrigation of 140 acres of land; it draws its suppy of water from McIntyre Creek with its headgate located at a point which bears south 28 degrees, 20 minutes west 635 feet from the quarter corner on the east side of Section 20, Township 10, N. Range 76 West, and entitled by appropriation to use of water from said stream to Priority No. 81, by construction thereof and thereby to the quantity of water with the number and date of the priority of appropriation thereof, hereinafter men-

[fol. 2880] tioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream for the use and benefit aforesaid under and by virtue of said appropriation by construction, Priority No. 81, seven cubic feet of water per second of time, or so much thereof as may be necessary to irrigate 140 acres of land, the appropriation of which water took effect on, and said priority dates from the 25th day of July, A. D. 1908.

No. 59—The Nellie Ditch

That ditch numbered 59, named the Nellie Ditch, Mrs. Nellie Thompson claimant, is a ditch constructed and used for the irrigation of about 200 acres in conjunction with the Thompson Ditch; it draws its supply of water from McQuire Creek with its headgate located at a point which bears south 31 degrees, 27 minutes west 1228 feet from the Northwest corner of Section 1, Township 10 N., Range 77 West of the 6th P. M., and entitled by appropriation to use of water from said stream Priority No. 76, by construction thereof and thereby to the quantity of water with the number and date of the priority of appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream for the use and benefit aforesaid under and by virtue of said appropriation by construction, Priority No. 76, 15.3 cubic feet of water per second of time, or so much thereof as may be necessary to irrigate two hundred acres of land, in conjunction with the Thompson Ditch, the appropriation of which water took effect on, and said priority dates from the 10th day Septem-
[fol. 2881] ber, 1903.

No. 60—The Timothy Ditch

That ditch numbered 60, named the Timothy Ditch, Hannah Mansfield and Elton Mansfield and John Mansfield claimants, is a ditch constructed and used for the irrigation of about 200 acres of land; it draws its supply of water from the Big Laramie River, with its headgate located at a point south 21 degrees west 39 chains and 68 links from the north quarter corner of Section 23, Township 10, North,

Range 76 West of the 6th P. M., and is entitled by appropriation to use of water from said stream to Priority No. 77, by construction thereof and thereby to the quantity of water with the number and date of the priority of appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream for the use and benefit aforesaid under and by virtue of said appropriation by construction, Priority No. 77, 34.36 cubic feet of water per second of time, or so much thereof as may be necessary to irrigate two hundred acres of land, the appropriation of which water took effect on, and said priority dates from the 5th day of July, 1904.

No. 61—Grace Creek Ditch, Second Enlargement

That ditch numbered 61, named the Grace Creek Ditch, Second Enlargement, Everett D. Bullard claimant, is a [fol. 2882] ditch constructed and used for the irrigation of about 480 acres of land that is as used in conjunction with the priorities for this ditch by original construction, and by first enlargement; it draws its supply of water from Grace Creek, a tributary of the Big Laramie River with its headgate located on the left bank of Grace Creek a tributary of the Big Laramie River on the Northwest quarter of the Northwest quarter of Section 14, Township 11, N. Range 77 West of the 6th P. M., at a point south 37 degrees, 45 minutes east 574 feet from the Northwest corner of said Section 14, and entitled by appropriation to use of water from said stream to Priority No. 80 by construction thereof and thereby to the quantity of water with the number and date of the priority of appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream for the use and benefit aforesaid under and by virtue of said appropriation by construction, Priority No. 80, ten cubic feet of water per second of time, or so much thereof as may be necessary to irrigate 480 acres of land, that in conjunction with the priorities for this ditch by original construction and by first enlargement, the appropriation of which water took effect on, and said priority dates from the 1st day of April, 1907.

No. 62—The Ollie Ditch

That ditch numbered 62, named The Ollie Ditch, Elton Mansfield, claimant, is a ditch constructed and used for the irrigation of 60 acres of land; it draws its supply of water from Jimmy Creek, with its headgate located at a point on [fol. 2883] the west bank of Jimmy Creek, a tributary of the Big Laramie River, south 13 degrees, 33 minutes east 1730 feet from the west quarter corner of Section 27, Township 11, North Range 76 West of the 6th P. M., and entitled by appropriation to use of water from said stream to Priority No. 61, by construction thereof and thereby to the quantity of water with the number and date of the priority of appropriation thereof, hereinafter mentioned, for the use aforesaid, and for the benefit of the party or parties lawfully entitled thereto;

It is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream for the use and benefit aforesaid under and by virtue of said appropriation by construction, Priority No. 61, 3.45 cubic feet of water per second of time, or so much thereof as may be necessary to irrigate 60 acres of land, the appropriation of which water took effect, on, and said priority dates from the 1st day of June, 1886, but said date is limited as set forth in the findings for said ditch herein, and in paragraph 8 of this decree.

No. 63—The La Garde Ditch Enlargement

That ditch numbered 63, named The La Garde Ditch Enlargement, J. H. Detro, T. Forrester and Thomas Tatham, claimants, is a ditch constructed and used for the irrigation of 215 acres of land; it draws its supply of water from La Garde Creek, with its headgate located at a point identical with the headgate of the La Garde Ditch, having Priority No. 11, of date June 10th 1883, and entitled by appropriation to use of water from said stream to Priority No. [fol. 2884] 64, by enlargement thereof and thereby to the quantity of water with the number and date of the priority of appropriation thereof, hereinafter mentioned, for the use aforesaid, and for the benefit of the party or parties lawfully entitled thereto;

It is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream for the use and

benefit aforesaid under and by virtue of said appropriation by enlargement, Priority No. 64, 4.87 cubic feet of water per second of time, or so much thereof as may be necessary to irrigate 215 acres of land, the appropriation of which water took effect, on, and said priority dates from the 1st day of June, 1896, but said date is limited as set forth in the findings for said ditch herein, and in paragraph 8 of this decree.

No. 64—Jimmy Creek Ditch Enlargement

That ditch numbered 64, named the Jimmy Creek Ditch Enlargement, Thomas Tatham, claimant, is a ditch constructed and used for the irrigation of 200 acres of land; it draws its supply of water from the east bank of Jimmy Creek and from the east bank of the Big Laramie River, with its headgates located at a point identical with the headgates of the Jimmy Creek Ditch, having Priority No. 14, of date June 1st, 1884, and entitled by appropriation to use of water from said stream to Priority No. 65, by enlargement thereof and thereby to the quantity of water with the number and date of the priority of appropriation thereof, hereinafter mentioned, for the use aforesaid, and for the benefit of the party of parties lawfully entitled thereto;
[fol. 2885] It is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream for the use and benefit aforesaid under and by virtue of said appropriation by construction, Priority No. 65, 9.48 cubic feet of water per second of time, by enlargement or so much thereof as may be necessary to irrigate 200 acres of land, the appropriation of which water took effect, on and said priority dates from the 2nd day of June, 1896, but said date is limited as set forth in the findings for said ditch herein, and in paragraph 8 of this decree.

No. 65—The John Goetz Ditch No. 1

That ditch numbered 65, named The John Goetz Ditch No. 1, E. M. Hohnholz, claimant, is a ditch constructed and used for the irrigation of 100 acres of land; it draws its supply of water from Shell Creek, a tributary of Sand Creek, with its headgate located at a point on the right bank of Shell Creek whence the southwest corner of Section 24, Township 12, N. Range 76 West of the 6th P. M., bears south 52 degrees, 5 minutes west 1745 feet, and en-

titled by appropriation to use of water from said stream to Priority No. 60, by construction thereof and thereby to the quantity of water with the number and date of the priority of appropriation thereof, hereinafter mentioned, for the use aforesaid, and for the benefit of the party or parties lawfully entitled thereto;

It is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream for the use and benefit aforesaid under and by virtue of said appropriation by construction, Priority No. 60, 7.8 cubic feet of [fol. 2886] water per second of time, or so much thereof as may be necessary to irrigate 100 acres of land, the appropriation of which water took effect, on and said priority dates from the 1st day of June, 1879, but said date is limited as set forth in the findings for said ditch herein.

No. 66—The John Goetz Ditch No. 2

That ditch numbered 66, named the John Goetz Ditch No. 2, E. M. Hohnholz claimant, is a ditch constructed and used for the irrigation of 200 acres of land; it draws its supply of water from Shell Creek with its headgate upon the left bank of said stream at a point whence the west quarter corner of Section 25, Township 12, North Range 76 West of the 6th P. M., bears south 75 degrees, fifteen minutes west 440 feet, and entitled by appropriation to use of water from said stream to Priority No. 83, by construction thereof and thereby to the quantity of water with the number and date of the priority of appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream for the use and benefit aforesaid under and by virtue of said appropriation by construction, Priority No. 83, ten cubic feet of water per second of time, or so much thereof as may be necessary to irrigate two hundred acres of land, the appropriation of which water took effect on, and said priority dates from the 9th day of June, 1909.

[fol. 2887] No. 67—The Shell Creek Ditch

That ditch numbered 67, named the Shell Creek Ditch, E. M. Hohnholz claimant, is a ditch constructed and used

for the irrigation of 80 acres of land; it draws its supply of water from Shell Creek, a tributary of Sand Creek, at a point whence the west quarter corner of Section 25, Township 12, North Range 76 West of the 6th P. M., bears north 69 degrees, 52 minutes east 541 feet, and entitled by appropriation to use of water from said stream to Priority Number 84, by construction thereof and thereby to the quantity of water with the number and date of the priority of appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream for the use and benefit aforesaid under and by virtue of said appropriation by construction, Priority No. 84, six and ninety seven hundredths cubic feet of water per second of time, or so much thereof as may be necessary to irrigate eighty acres of land, the appropriation of which water took effect on, and said priority dates from the 10th day of June, 1909.

No. 68—The Dry Creek Ditch

That ditch numbered 68, named The Dry Creek Ditch, E. M. Hohnholz, claimant, is a ditch constructed and used for the irrigation of 125 acres of land; it draws its supply of water from Dry Creek with its headgate upon the left bank of said stream at a point whence the east quarter corner of Section 25, Township 12, North Range 76 West of the 6th P. M., bears north 54 degrees east 970 feet, and entitled by appropriation to use of water from said stream [fol. 2888] to Priority Number 85, by construction thereof and thereby to the quantity of water with the number and date of the priority of appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream for the use and benefit aforesaid under and by virtue of said appropriation by construction, Priority No. 85, ten cubic feet of water per second of time, or so much thereof as may be necessary to irrigate one hundred and twenty five acres of land, the appropriation of which water took effect on, and said priority dates from the 11th day of June, 1909.

No. 69—The Thompson Ditch

That ditch numbered 69, named The Thompson Ditch, Mrs. Nellie Thompson, claimant, is a ditch constructed and used for the irrigation of 80 acres of land; it draws its supply of water from British Creek with its headgate located at a point which bears south 57 degrees, 50 minutes west 12,100 feet from the northeast corner of Section 1, Township 10 North, Range 77 West of the 6th P. M., and entitled by appropriation to use of water from said stream to Priority No. 82, by construction thereof and thereby to the quantity of water with the number and date of the priority of appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream for the use and benefit aforesaid under and by virtue of said appropriation by construction, Priority No. 82, five cubic feet of water per second of time, or so [fol. 2889] much thereof as may be necessary to irrigate eighty acres of land, the appropriation of which water took effect on, and said priority dates from the 26th day of May, 1909.

No. 70—The Detro Ditch No. 2

That ditch numbered 70, named The Detro Ditch No. 2, J. H. Detro, claimant, is a ditch constructed and used for the irrigation of 45 acres of land; it draws its supply of water from the Big Laramie River, with its headgate upon the east bank of said stream at a point south 77 degrees, 3 minutes east 1500 feet from the west quarter corner of Section 7, Township 11 North, Range 76 West of the 6th P. M., and entitled by appropriation to use of water from said stream to Priority No. 79, by construction thereof and thereby to the quantity of water with the number and date of the priority of appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream for the use and benefit aforesaid under and by virtue of said appropriation by construction, Priority No. 79, eight cubic feet of water per second of time or so much thereof as may be necessary to irrigate forty-five acres of land, the appro-

priation of which water took effect on, and said priority dates from the 16th day of January, 1906.

No. 71—Stubb Creek Ditch

That ditch numbered 71, named The Stubb Creek Ditch, Thomas H. Davy, claimant, is a ditch constructed and used for the irrigation of one hundred and fifty acres of land; it [fol. 2890] draws its supply of water from Stubb Creek with its headgate upon the west bank of said stream at a point whence the northeast corner of Section 35, Township 10, North Range 76 West of the 6th P. M., bears north 80 degrees, 20 minutes east 1586 feet, and entitled by appropriation to use of water from said stream to Priority No. 88, by construction thereof and thereby to the quantity of water with the number and date of the priority of appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream for the use and benefit aforesaid under and by virtue of said appropriation by construction, Priority No. 88, five cubic feet of water per second of time, or so much thereof as may be necessary to irrigate one hundred and fifty acres of land, the appropriation of which water took effect on, and said priority dates from the 28th day of July, 1911.

Ditch No. 72—The Rawah Ditch of the Laramie River System

That said ditch, as set forth in the findings herein, is entitled to Ditch Priority No. 71. It is claimed by The Greeley-Poudre Irrigation District, a corporation. It derives its supply of water from Rawah, West Springer, Rapid, Fall, Winifred and Mill Creeks and divers other creeks situate between Rawah Creek and the West Fork of the Laramie River, but, particularly, the upper portion or tributaries of all said streams. This ditch has its first and principal headgate on the east bank of Rawah Creek, in Larimer County, [fol. 2891] Colorado, near a point in the Northeast Quarter (NE¼) Southwest Quarter (SW¼) of Section Thirty-two (32), Township Nine (9) North, Range Seventy-six (76) West of the 6th P. M., whence the southwest corner of said Section 32 bears south 50° 50′ West 2950 feet, from which point it runs in a general easterly and southerly direction

to the north slope of the drainage area of the West Fork of the Laramie River where its waters are discharged and flow to said West Fork of the Laramie River and thence to the Laramie River Tunnel and the Cache la Poudre River. Along its course it intersects the above mentioned streams, at each of which there is a separate point of diversion identical with the intersection of said ditch with the east or south bank of each of said streams. It is intended to be used for the diversion and carriage of waters from the several creeks above mentioned to the Laramie River Tunnel and its Tunnel Reservoir and thence to the Cache la Poudre River for the irrigation of the lands of claimant. The dimensions, grade, size and carrying capacity of said ditch are as follows: Width on bottom 6 feet, depth below high water line 4 feet, slope of banks 1 to 1, grade 3 feet per thousand feet, or 15.84 feet per mile, and a carrying capacity of 225 cubic feet per second of time.

Said ditch is also intended for use as an essential part of the Laramie River System of the claimant for the carriage of waters, the flow of which has been stored and regulated by the Link Lakes Reservoirs, or delivered by the McIntyre Ditch, such use being in addition to its use as a canal for the diversion of waters from said streams as aforesaid.

The said ditch is in large measure complete, but, owing to the fact that water diverted by said canal has not been ap- [fol. 2892] plied to beneficial use for the irrigation of lands, no final decree can be awarded.

It is hereby adjudged and decreed that said ditch be given Ditch Priority No. 71, of date August 25, 1902, provided it be shown in a proper proceeding that said ditch has been fully completed and water has been diverted and thereby applied to the irrigation of lands within a reasonable time, or in the event said ditch be not further completed that water by it diverted be so applied, in which event it shall be decreed priority as from those creeks to which the same shall be finally completed, but in no case shall said ditch be awarded the right to divert more than 225 cubic feet of water per second of time from the said sources of supply, with the right to maintain the flow of water in said ditch to said capacity by conjunctive use with the Link Lakes Reservoirs and the McIntyre Ditch.

Ditch No. 73—The Rawah & Lower Supply Ditch of the Laramie River System

That said ditch, as set forth in the findings herein, is entitled to Ditch Priority No. 72. It is claimed by The Greeley-Poudre Irrigation District, a corporation. It derives its supply of water from Rawah, West Springer, Rapid, Fall, Winifred, Mill and divers other streams, tributary to the Laramie River, entering said stream on the west side thereof between Rawah Creek and the West Fork of the Laramie River. This ditch has its first or principal headgate on the east or south bank of Rawah Creek in Larimer County, Colorado, near a point in the Southwest Quarter (S. W. ¼) Southeast Quarter (S. E. ¼) of Section Fourteen (14), Township Nine (9) North, Range [fol. 2893] Seventy-six (76) West of the 6th P. M., whence the southeast corner of said section bears South 71° 0' West about 2540 feet distant, from which point it runs in a general southeasterly direction to the bed and channel of the Laramie River at a point near the west portal of the Laramie River Tunnel and in the Tunnel Reservoir, and from which said point of delivery said waters are conveyed through the Laramie River Tunnel to the Cache la Poudre River. It intersects the lines of said streams situate between Rawah Creek and the West Fork of the Laramie River and has points of diversion as to each thereof, said points being in each instance identical with the point of intersecton of sad ditch with the south or east banks of said streams. It is intended to be used for the diversion and carriage of waters from the several streams above mentioned to the Laramie River Tunnel and its Tunnel Reservoir and thence to the Cache la Poudre River for the irrigation of the lands of claimant, and, also, as an essential part of the Laramie River System of the claimant for the carriage of waters stored and regulated in the Link Lakes Reservoirs, or waters conveyed by the McIntyre Ditch and delivered at the headgate of this ditch by use of Rawah Creek.

It is not fully completed and no water has been by it diverted or applied to a beneficial use. The dimensions, grade, size and carrying capacity of said ditch vary from the point of beginning to the point of discharge and are divided into four divisions, as follows:

[fol. 2894]

Division	Material	Bottom width	Slide slopes of banks	Depth water	Grade per 1000 ft.	Length feet	Cap. cu. ft.
Rawah Creek	Loose	9 ft.	1 to 1	4 ft.	2 ft.	16000	200
	Solid	8 ft.	1-2 to 1	4 ft.	3 ft.		
Rapid Creek	Loose	10 ft.	1 to 1	4.5 ft.	1.5 ft.	2400	250
	Solid	9 ft.	1-2 to 1	4.5 ft.	3 ft.		
Fall Creek	Loose	11 ft.	1 to 1	4.5 ft.	1.5 ft.	3300	270
	Solid	10 ft.	1-2 to 1	4.5 ft.	2.7 ft.		
Mill Creek	Loose	11 ft.	1 to 1	4.6 ft.	1.5 ft.	3100	275
	Solid	10 ft.	1-2 to 1	4.6 ft.	2.7 ft.		

It is hereby adjudged and decreed that said ditch be given Ditch Priority No. 72, of date August 25, 1902, provided it be shown in a proper proceeding that it has been completed and water has been diverted and applied to the irrigation of lands within a reasonable time, but in no event shall said ditch be awarded the right to divert from said several sources of supply more than 275 cubic feet of water per second of time, with the right to maintain the flow in said ditch to said capacity by the conjunctive use of said ditch with the Link Lakes Reservoirs and the McIntyre Ditch.

Ditch No. 74. The McIntyre Ditch of the Laramie River System

That said ditch, as set forth in the findings herein, is entitled to Ditch Priority No. 73. It is claimed by The Greeley-Poudre Irrigation District, a corporation. It derives its supply of water from McIntyre Creek and some small tributaries of Rawah Creek intersected by said ditch along its lines. Its first and principal headgate is on the [fol. 2895] east bank of McIntyre Creek, in Larimer County, Colorado, at or near a point in the Northeast Quarter (NE¼) Northeast Quarter (NE¼) of Section Thirty-one (31), Township Nine (9) North, Range Seventy-six (76) West of the 6th P. M., whence the west corner of said Section 31 bears South 12°, 41′ East 4257 feet distant, from which point said ditch extends in a general southeasterly direction to Rawah Creek and at or near the headgate and place of beginning of the Rawah Ditch. It is intended to be used for the diversion and carriage of water from said McIntyre Creek and said branches of Rawah Creek, to the Cache la Poudre River by use of either the Rawah or Rawah and Lower Supply Ditches, the Tunnel Reservoir and the Laramie River Tunnel of claimant. Said ditch is not as yet complete, but is intended to be of the following dimensions, grade, size and carrying capacity; width on bottom four feet, depth below high water line 2.2 feet, slope of banks 1 to 1, grade 3 feet per thousand feet, or 15.84 feet per mile and a carrying capacity of 40 cubic feet of water per second of time. Said ditch is intended to be used not only for the diversion of water from McIntyre Creek, but also as an essential part or unit of the entire Laramie River System of the claimant, and when so used will convey the waters stored or regulated in Link Lakes

Reservoirs 10 and 11, discharging said waters for carriage as aforesaid.

It is hereby adjudged and decreed that said ditch be given Ditch Priority No. 73, of date August 25, 1902, provided it be shown in a proper proceeding that it has been completed and water diverted an applied to the irrigation [fol. 2896] of lands within a reasonable time, but in no event shall said ditch be awarded the right to divert from said sources of supply more than 40 cubic feet of water per second of time, with the right to maintain said flow at said capacity by conjunctive use with Link Lakes Reservoirs 10 and 11.

Ditch No. 75—The Deadman & Nunn Creek Ditch of the Laramie River System

That said ditch, as set forth in the findings herein, is entitled to Ditch Priority No. 74. It is claimed by The Greeley-Poudre Irrigation District, a corporation. It derives its supply of water from Deadman, Nunn, Porter, Brinker, East Springer and Half Mile Creeks and several other small streams of unknown names situate between Springer Creek and the Laramie River Tunnel. This ditch has its first and principal headgate on the south bank of Deadman Creek in the Northeast Quarter (NE¼) of Section Thirty-one (31), Township Ten (10) North, Range Seventy-five (75) West of the 6th P. M., at or near a point whence the southwest corner of said section bears South 43° 40′ 2015 feet distant, from which point it runs in a southerly direction to the Laramie River Tunnel intersecting the above mentioned streams, at which several points of intersection said ditch has additional headgates and points of diversion on the south banks of each said creeks. It is intended to be used for the diversion and carriage of water from the several creeks above mentioned to the Laramie River Tunnel and its Tunnel Reservoir and thence to the Cache la Poudre River, for the irrigation of lands of claimant. The dimensions, grade, size and carrying capacity of said ditch vary from the point of beginning to the point of discharge and are divided into three divisions, as follows:

[fol. 2897]

Division	Material	Bottom width	Slide slopes of banks	Water depth	Grade per 1000 ft.	Length feet	Cap. cu. ft.
Deadman	Loose	7 ft.	1 to 1	3.3 ft.	2.5 ft.	15000	125
	Solid	6 ft.	1-2 to 1	3.3 ft.	4.5 ft.		
Nunn	Loose	10 ft.	1 to 1	4.5 ft.	1.5 ft.	1100	250
	Solid	9 ft.	1-2 to 1	4.5 ft.	3.0 ft.		
Porter	Loose	11 ft.	1 to 1	4.5 ft.	1.6 ft.	24000	275
	Solid	10 ft.	1-2 to 1	4.5 ft.	2.7 ft.		

No water has been diverted by means of said ditch, owing to the fact that a portion of the same remains yet to be completed.

It is hereby adjudged and decreed that said ditch be given Ditch Priority No. 74, of date August 25, 1902, provided it be shown in a proper proceeding that it has been completed and water has been diverted and applied to the irrigation of lands within a reasonable time, but in no event shall said ditch be awarded the right to divert from said several sources of supply more than 275 cubic feet of water per second of time.

Ditch No. 76—The Laramie River Tunnel of the Laramie River System

That said tunnel, as set forth in the findings herein, is entitled to Ditch Priority No. 75. It is claimed by The Greeley-Poudre Irrigation District, a corporation. It derives its supply of water from the Laramie River and the West Fork of the Laramie River. Its intake or point of beginning is on the east bank of the Laramie River, near the mouth of West Fork, and in the Northeast Quarter (NE¼) Southwest Quarter (SW¼) of Section Seven (7), [fol. 2898] Township Eight (8) North, Range Seventy-five (75) West of the 6th P. M., from which point it passes through and under the Green Mountains to the Cache la Poudre River. It is intended to be used for the diversion and carriage of water from said streams to the Cache la Poudre River for the irrigation of the lands of claimant, and, also, as the principal unit or portion of the entire Laramie River System of the claimant, in conjunction with all the remaining units thereof, for the conveyance of all waters collected, regulated, diverted, conveyed and discharged at its west portal and into its Tunnel Reservoir, which said reservoir will be used for the regulation of the flow of water through said tunnel. It is 9½ feet wide by 7½ feet high in the clear and has a grade of 1.7 feet per thousand feet. Said tunnel is practically complete and ready for the carriage of water but no diversion or application of water from any of said sources has been made thereby, largely owing to litigation now pending between Wyoming and Colorado and involving the right to make such diversion.

It is hereby adjudged and decreed that said tunnel be given Ditch Priority No. 75, of date August 25, 1902, provided it be shown in a proper proceeding that it has been completed and water has been diverted and applied to the irrigation of lands within a reasonable time, but in no event shall said tunnel be awarded the right to divert from said several sources of supply more water than will flow through said tunnel as of the dimensions, grade and capacity aforesaid, when not used with its regulating basin, and, in addition thereto, it shall be given the right to maintain the flow of water to its capacity when said tunnel is used in conjunction with the remaining units of said system for the carriage of water discharged into its west portal.

[fol. 2899] No. 77—The Upper Hills Ditch

That ditch numbered 77, named The Upper Hills Ditch, The Greeley-Poudre Irrigation District, claimant, is a ditch constructed and used for the irrigation of 200 acres of land; it draws its supply of water from the Big Laramie River, with its headgate located on the east bank of the Laramie River, at a point whence the south quarter corner of Section 34, Township 11 North, Range 76 West of the 6th P. M., bears south 73 degrees, 18 minutes east 2,345 feet, and entitled by appropriation to use of water from said stream to Priority No. 62, by construction thereof and thereby to the quantity of water with the number and date of the priority of appropriation thereof, hereinafter mentioned, for the use aforesaid, and for the benefit of the party or parties lawfully entitled thereto;

It is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream for the use and benefit aforesaid under and by virtue of said appropriation by construction, Priority No. 62, 10 cubic feet of water per second of time, or so much thereof as may be necessary to irrigate 200 acres of land, the appropriation of which water took effect on, and said priority dates from the 1st day of May, 1887, but said date is limited as set forth in the findings for said ditch herein, and in paragraph 8 of this decree.

No. 78—Second Enlargement and Extension of Martin Ditch No. 2

That ditch numbered 78, named The Second Enlargement and Extension of Martin Ditch No. 2, The Greeley-Poudre

Irrigation District, claimant, is a ditch constructed and used for the irrigation of eighty acres of land; it draws its supply [fol. 2900] of water from the Laramie River with its headgate upon the west bank of said stream at a point whence the north quarter corner of Section 10, Township 10, North Range 76 West of the 6th P. M., bears North 4 degrees, 35 minutes west 1,920 feet, and entitled by appropriation to use of water from said stream to Priority No. 86, by construction thereof and thereby to the quantity of water with the number and date of the priority of appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream for the use and benefit aforesaid under and by virtue of said appropriation by construction, Priority No. 86, six cubic feet of water per second of time, or so much thereof as may be necessary to irrigate eighty acres of land, the appropriation of which water took effect on, and said priority dates from the 25th day of May, 1910.

No. 79—Enlargement of the Mansfield Ditch

That ditch numbered 79, named The Enlargement of the Mansfield Ditch, The Greeley-Poudre Irrigation District, claimant, is a ditch constructed and used for the irrigation of seventy-five acres of land; it draws its supply of water from the Big Laramie River, with its headgate identical with the headgate of the Mansfield Ditch as shown in the former decree of this Court, and entitled by appropriation to use of water from said stream to Priority No. 68, by construction thereof and thereby to the quantity of water with the number and date of the priority of appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow [fol. 2901] into said ditch from said stream for the use and benefit aforesaid under and by virtue of said appropriation by enlargement, Priority No. 68, for 4 feet additional, making a total of 15.61 cubic feet of water per second of time, or so much thereof as may be necessary to irrigate seventy-five acres of land, the appropriation of which water took effect on, and said priority dates from the 1st day of April, 1902, but said date is limited as set forth in the findings for said ditch herein, and in paragraph 8 of this decree.

No. 80—The Enlargement of Mansfield Ditch No. 2

That ditch numbered 80, named The Enlargement of Mansfield Ditch No. 2, the Greeley-Poudre Irrigation District, claimant, is a ditch constructed and used for the irrigation of one hundred and fifty acres of land; it draws its supply of water from the Big Laramie River, with its headgate located at the identical point of the location of the headgate of the Mansfield Ditch No. 2, as heretofore fixed by decree of this Court, and entitled by appropriation to use of water from said stream to Priority No. 69, by construction thereof and thereby to the quantity of water with the number and date of the priority of appropriation thereof, hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto; it is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream for the use and benefit aforesaid under and by virtue of said appropriation by enlargement, Priority No. 69, for 1.9 cubic feet of water addi-
[fol. 2902] tional, with a total of 21.74 cubic feet of water per second time, or so much thereof as may be necessary to irrigate one hundred and fifty acres of land, the appropriation of which water took effect on, and said Priority dates from the 15th day of April, 1902, but said date is limited as set forth in the findings for said ditch herein, and in paragraph 8 of this decree.

Ditch No. 81—The Mansfield Ditch No. 3

That said ditch set forth in the findings herein is entitled to ditch Priority No. 78. It is claimed by The Greeley-Poudre Irrigation District, a corporation, and derives its supply of water from the Laramie River, the headgate thereof being situate on the west bank of said stream, at a point bearing south 74 degree, 45 minutes east 1365, from the east quarter corner of Section Two (2), Township Eleven (11) North, Range Seventy-seven (77) West of the 6th P. M., from which point it runs in a northwesterly direction about one and one-half miles. It will be used for the diversion and carriage of water from said river for the irrigation of about 75 acres of land situate on the Upper Boswell Ranch, and lying immediately above those lands already irrigated by Mansfield Ditch No. 2. Said ditch is being constructed of the following dimensions: Six feet wide on the bottom, eight

feet wide on top, water depth two feet, a grade of 5.28 feet per mile, and has a carrying capacity of 29.4 cubic feet of water per second of time. No water has been diverted by means of said ditch or applied to the irrigation of the lands on account of the fact that the lower portion thereof has not yet been completed.

[fol. 2903] It is hereby adjudged and decreed that said ditch be given Ditch Priority No. 78, provided it be shown in the proper proceeding that it has been completed and water has been diverted and applied to the irrigation of lands, within a reasonable time. But in no event shall said ditch be awarded the right to divert from said stream more than 29.4 cubic feet of water per second of time for the irrigation of not to exceed 75 acres of land.

No. 82—The Stuart Ditch

That ditch numbered 82, named the Stuart Ditch, The Greeley-Poudre Irrigation District, claimant, is a ditch constructed and used for the irrigation of about 25 acres of land; it draws its supply of water from Stuart Creek, with its headgate located on the north bank of said Creek, at a point whence the southwest corner of Section 5, Township 10, North, Range 76 West of the 6th P. M., bears south 10 degrees, east 4045 feet, and entitled by appropriation to use of water from said stream to Priority No. 63 by construction thereof and thereby to the quantity of water with the number and date of the priority of appropriation thereof, hereinafter mentioned, for the use aforesaid, and for the benefit of the party or parties lawfully entitled thereto;

It is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream for the use and benefit aforesaid under and by virtue of said appropriation by construction, Priority No. 63, 7.2 cubic feet of water per second of time, or so much thereof as may be necessary to irrigate 25 acres of land, the appropriation of which water took effect, on and said priority dates from the 15th day of April, 1896, but said date is limited as set forth in the find-
[fol. 2904] ings for said ditch herein, and in paragraph 8 of this decree.

Ditch No. 83—The Stuart Ditch No. 2

That said ditch set forth in the findings herein is entitled to Ditch Priority No. 89, which is claimed by The Greeley-Poudre Irrigation District, a corporation. It derives its supply of water from McIntyre Creek, the headgate thereof being on the east bank of said Creek, at a point whence the north quarter section corner of Section Five (5), Township Ten (10) North, Range Seventy-six (76) west bears north 24 degrees 50 minutes west 7770 feet distant, from which point said ditch runs in a northerly direction for about two miles.

It is being constructed six feet wide on the bottom, eight feet wide on top, capable of carrying water two feet in depth, with a grade of 5.28 feet per mile, and a carrying capacity of 29.4 cubic feet of water per second of time, and can be used for the irrigation of about 60 acres of land belonging to claimant, and lying on the east side of McIntyre Creek and on the west slope of Middle Mountain. No water has been diverted by means of said ditch owing to the fact that it is not yet complete.

It is hereby adjudged and decreed that said ditch be given Ditch Priority No. 89, of date May 24th, 1913, provided it be shown in a proper proceeding that it has been completed and water has been diverted and applied to the irrigation of lands within a reasonable time, but in no event shall said ditch be awarded the right to divert from McIntyre Creek more than 29.4 cubic feet of water per second of time for the irrigation of not to exceed 60 acres of land, situate as aforesaid.

[fol. 2905] No. 84—Enlargement of Link Ditch No. 2

That ditch numbered 84, named The Enlargement of Link Ditch No. 2, The Greeley-Poudre Irrigation District, claimant, is a ditch constructed and used for the irrigation of 50 acres of land; it draws its supply of water from Link Creek, with its headgate located at a point identical with the headgate of the Link Ditch No. 2, as heretofore fixed by decree of this Court in Priority No. 32, of date the 10th day of June, 1896, and entitled by appropriation to use of water from said stream to Priority No. 66, by enlargement thereof and thereby to the quantity of water with the number and date of the priority of appropriation thereof, hereinafter

mentioned, for the use aforesaid, and for the benefit of the party or parties lawfully entitled thereto;

It is hereby adjudged and decreed that there be allowed to flow into said ditch from said stream for the use and benefit aforesaid under and by virtue of said appropriation by construction, Priority No. 66, by enlargement, for 3.4 cubic feet of water per second of time, or so much thereof as may be necessary to irrigate 50 acres of land, the appropriation of which water took effect on, and said priority dates from the 15th day of June, 1896, but said date is limited as set forth in the findings for said ditch herein, and in paragraph 8 of this decree.

[fol. 2906] Reservoir Decree

[fol. 2907] No. 3—Wears Ditch and Reservoir

That reservoir numbered 3, named the Wears Ditch and Reservoir, James A. Wears, claimant, is a reservoir constructed to irrigate about 160 acres of land; it is located on parts of Sections 34 and 35, Township 11 North, Range 76 West of the 6th P. M. It takes its supply of water from Jim Creek, a tributary of the Big Laramie River, through the inlet ditch, and is entitled to one appropriation for the purpose of filling said reservoir from the said stream to Priority No. 19, by construction thereof, and thereby entitled to the quantity of water with the number and date of priority of appropriation thereof hereinafter mentioned, for the use aforesaid, and for the benefit of the party or parties lawfully entitled thereto.

It is hereby adjudged and decreed that the said reservoir be allowed to have stored in it from Jim Creek, by means of the ditch aforesaid, and for the benefit of the party or parties aforesaid, under and by virtue of the said appropriation by construction Priority No. 19, so much water as is necessary to fill said reservoir to a depth of 7 feet and 6 inches above the bottom of the outlet tube with a capacity of 2,947,628 cubic feet of water, which appropriation of water for storage purposes took effect on and dates from the 15th day of October, 1908.

No. 4—Johnson Reservoir

That reservoir numbered 4, named the Johnson Reservoir, Everett D. Bullard, claimant, is a reservoir construct-

ed to irrigate about 100 acres of land; it is located on parts of Sections 2, 3, 10 and 11, in Township 11 North, Range 77 West of the 6th P. M., with an area at its upper contour of about 52 acres. It takes its supply of water from Grace [fol. 2908] Creek, a tributary of the Big Laramie River, through the Grace Creek Ditch, and is entitled to one appropriation for the purpose of filling said reservoir from the said stream, to Priority No. 3, by construction thereof, and thereby entitled to the quantity of water with the number and date of priority of appropriation thereof hereinafter mentioned, for the use aforesaid and for the benefit of the party or parties lawfully entitled thereto.

It is hereby adjudged and decreed that the said reservoir be allowed to have stored in it from Grace Creek, by means of the ditch aforesaid, and for the benefit of the party or parties aforesaid, under and by virtue of the said appropriation by construction, Priority No. 3, so much water as is necessary to fill said reservoir to a depth of 3 feet above the bottom of the outlet tube with a capacity of 6,500,000 cubic feet of water, which appropriation of water for storage purposes took effect on and dates from the 1st day of June, 1897.

Reservoir No. 5—Link Lake Reservoir No. 1 of the Laramie River System

That said reservoir, as set forth in the findings herein, is entitled to Reservoir Priority No. 4. It is claimed by The Greeley-Poudre Irrigation District, a corporation. It is located in Larimer County, Colorado, upon the SE¼ of Section Seven (7), Township Eight (8) North, Range 76 West of the 6th P. M. It will be constructed across a branch of Rawah Creek and has no inlet ditch, said creek serving to convey water to said reservoir. Rawah Creek is used to convey waters from its outlet to the Laramie River Tunnel, by way of The Rawah Ditch or The Rawah & Lower Supply Ditch of claimant. It derives its supply [fol. 2909] of water from said branch of Rawah Creek, being that portion of said stream lying between the crest of the Medicine Bow range of mountains and said reservoir. This reservoir is intended to be used for the storage of water for irrigation, and, also, as an essential part of the Laramie River System of the claimant for regulating the flow of water through said system and to the Cache la

Poudre River. The said reservoir is not as yet constructed, but it is intended to be constructed as follows: Area at high water line 30 acres, depth of water to be stored 35 feet and estimated storage and regulating capacity 45,738,000 cubic feet.

It is hereby adjudged and decreed that said reservoir be given Reservoir Priority No. 4, of date August 25, 1902, provided it be shown in a proper proceeding that said reservoir has been completed and water has been diverted and applied thereby to the irrigation of lands within a reasonable time, but in no case shall the amount decreed said reservoir exceed a storage depth of 35 feet above the bottom of the outlet tube and a capacity of 45,738,000 cubic feet.

Reservoir No. 6—Link Lake Reservoir No. 2 of the Laramie River System

That said reservoir, as set forth in the findings herein, is entitled to Reservoir Priority No. 5. It is claimed by The Greeley-Poudre Irrigation District, a corporation. It is located in Larimer County, Colorado, upon the SW¼ of Section 5, Township 8 North, Range 76 West of the 6th P. M. It will be constructed across a branch of Rawah Creek and has no inlet ditch, said creek serving to convey water to said reservoir. Rawah Creek is used to convey waters from its outlet to the Laramie River Tunnel, by way of The Rawah Ditch or The Rawah & Lower Supply Ditch of claimant. It derives its supply of water from said [fol. 2910] branch of Rawah Creek, being that portion of said stream lying between the crest of the Medicine Bow range of mountains and said reservoir. This reservoir is intended to be used for the storage of water for irrigation, and, also, as an essential part of the Laramie River System of the claimant for regulating the flow of water through said system and to the Cache la Poudre River. The said reservoir is not as yet constructed, but it is intended to be constructed as follows: Area at high water line 50 acres, depth of water to be stored 30 feet, and estimated storage and regulating capacity 60,984,000 cubic feet.

It is hereby adjudged and decreed that said reservoir be given Reservoir Priority No. 5, of date August 25, 1902, provided it be shown in a proper proceeding that said reservoir has been completed and water has been diverted

and applied thereby to the irrigation of lands within a reasonable time, but in no case shall the amount decreed said reservoir exceed a storage depth of 30 feet above the bottom of the outlet tube and a capacity of 60,984,000 cubic feet.

Reservoir No. 7—Link Lake Reservoir No. 3 of the Laramie River System

That said reservoir, as set forth in the findings herein, is entitled to Reservoir Priority No. 6. It is claimed by The Greeley-Poudre Irrigation District, a corporation. It is located in Larimer County, Colorado, upon the NW¼ of Section 5, Township 8 North, Range 7 6West of the 6th P. M. It will be constructed across a branch of Rawah Creek and has no inlet ditch, said creek serving to convey water to said reservoir. Rawah Creek is used to convey waters from its outlet to the Laramie River Tunnel, by way of The Rawah Ditch or The Rawah & Lower Supply Ditch of claimant. It derives its supply of water from said branch of Rawah Creek, being that portion of said [fol. 2911] stream lying between the crest of the Medicine Bow range of mountains and said reservoir. This reservoir is intended to be used for the storage of water for irrigation, and, also, as an essential part of the Laramie River System of the claimant for regulating the flow of water through said system and to the Cache la Poudre River. The said reservoir is not as yet constructed, but it is intended to be constructed as follows: Area at high water line 16 acres, depth of water to be stored 30 feet and estimated storage and regulating capacity 22,869,000 cubic feet.

It is hereby adjudged and decreed that said reservoir be given Reservoir Priority No. 6, of date August 25, 1902, provided it be shown in a proper proceeding that said reservoir has been completed and water has been diverted and applied thereby to the irrigation of lands within a reasonable time, but in no case shall the amount decreed said reservoir exceed a storage depth of 30 feet above the bottom of the outlet tube and a capacity of 22,869,000 cubic feet.

Reservoir No. 8. Link Lake Reservoir No. 4 of the Laramie River System

That said reservoir, as set forth in the findings herein, is entitled to Reservoir Priority No. 7. It is claimed by

The Greeley-Poudre Irrigation District, a corporation. It is located in Larimer County, Colorado, upon the NW¼ of Section 5, Township 8 North, Range 76 West and the SW¼ of Section 32, Township 9 North, Range 76 West of the 6th P. M. It will be constructed across Rawah Creek and has no inlet ditch, said creek serving to convey water to said reservoir. Rawah Creek is used to convey waters from its outlet to the Laramie River Tunnel, by way of The Rawah Ditch and The Rawah & Lower Supply Ditch of claimant. It derives its supply of water from Rawah Creek, being that portion of said stream lying between the crest [fol. 2912] of the Medicine Bow range of mountains and said reservoir. This reservoir is intended to be used for the storage of water for irrigation, and, also, as an essential part of the Laramie River System of the claimant for regulating the flow of water through said system and to the Cache la Poudre River. The said reservoir is not as yet constructed, but it is intended to be constructed as follows: Area at high water line 20 acres, depth of water to be stored 25 feet and estimated storage and regulating capacity 25,780,000 cubic feet.

It is hereby adjudged and decreed that said reservoir be given Reservoir Priority No. 7, of date August 25, 1902, provided it be shown in a proper proceeding that said reservoir has been completed and water has been diverted and applied thereby to the irrigation of lands within a reasonable time, but in no case shall the amount decreed said reservoir exceed a storage depth of 25 feet above the bottom of the outlet tube and a capacity of 25,780,000 cubic feet.

Reservoir No. 9. Link Lake Reservoir No. 5 of the Laramie River System

That said reservoir, as set forth in the findings herein, is entitled to Reservoir Priority No. 8. It is claimed by The Greeley-Poudre Irrigation District, a corporation. It is located in Larimer County, Colorado, upon the N½ of Section 5, Township 8 North, Range 76 West of the 6th P. M. It will be constructed across a branch of Rawah Creek and has no inlet ditch, said creek serving to convey water to said reservoir. Rawah Creek is used to convey waters from its outlet to the Laramie River Tunnel, by way of The Rawah Ditch or The Rawah & Lower Supply

Ditch of claimant. It derives its supply of water from said branch of Rawah Creek, being that portion of said stream [fol. 2913] lying between the crest of the Medicine Bow range of mountains and said reservoir. This reservoir is intended to be used for the storage of water for irrigation, and, also, as an essential part of the Laramie River System of the claimant for regulating the flow of water through said system and to the Cache la Poudre River. The said reservoir is not as yet constructed, but it is intended to be constructed as follows: Area at high water line 20 acres, depth of water to be stored 35 feet and estimated storage and regulating capacity 30,492,000 cubic feet.

It is hereby adjudged and decreed that said reservoir be given Reservoir Priority No. 8, of date August 25, 1902, provided it be shown in a proper proceeding that said reservoir has been completed and water has been diverted and applied thereby to the irrigation of lands within a reasonable time, but in no case shall the amount decreed said reservoir exceed a storage depth of 35 feet above the bottom of the outlet tube and a capacity of 30,492,000 cubic feet.

Reservoir No. 10—Link Lake Reservoir No. 6 of the Laramie River System

That said reservoir, as set forth in the findings herein, is entitled to Reservoir Priority No. 9. It is claimed by The Greeley-Poudre Irrigation District, a corporation. It is located in Larimer County, Colorado, upon the N½ of Section 5, Township 8 North, Range 76 West and the SW¼ of Section 32, Township 9 North, Range 76 West of the 6th P. M. It will be constructed across a branch of Rawah Creek and has no inlet ditch, said creek serving to convey water to said reservoir. Rawah Creek is used to convey waters from its outlet to the Laramie River Tunnel, by way of The Rawah Ditch or The Rawah & Lower Supply Ditch of claimant. It derives its supply of water from said branch of Rawah Creek, being that portion of said stream [fol. 2914] lying between the crest of the Medicine Bow range of mountains and said reservoir. This reservoir is intended to be used for the storage of water for irrigation, and, also, as an essential part of the Laramie River System of the claimant for regulating the flow of water through said system and to the Cache la Poudre River.

The said reservoir is not as yet constructed, but it is intended to be constructed as follows: Area at high water line 12 acres, depth of water to be stored 25 feet and estimated storage and regulating capacity 13,068,000 cubic feet.

It is hereby adjudged and decreed that said reservoir be given Reservoir Priority No. 9, of date August 25, 1902, provided it be shown in a proper proceeding that said reservoir has been completed and water has been diverted and applied thereby to the irrigation of lands within a reasonable time, but in no case shall the amount decreed said reservoir exceed a storage depth of 25 feet above the bottom of the outlet tube and a capacity of 13,068,000 cubic feet.

Reservoir No. 11—Link Lakes Reservoir No. 7 of the Laramie River System

That said reservoir, as set forth in the findings herein, is entitled to Reservoir Priority No. 10. It is claimed by The Greeley-Poudre Irrigation District, a corporation. It is located in Larimer County, Colorado, upon the NE¼ of Section 5, Township 8 North, Range 76 West of the 6th P. M. It will be constructed across a branch of Rawah Creek and has no inlet ditch, said creek serving to convey water to said reservoir. Rawah Creek is used to convey waters from its outlet to the Laramie River Tunnel, by way of The Rawah Ditch or The Rawah & Lower Supply Ditch of claimant. It derives its supply of water from said branch of Rawah Creek, being that portion of said stream lying between the crest of the Medicine Bow range of moun-[fol. 2915] tains and said reservoir. This reservoir is intended to be used for the storage of water for irrigation, and, also, as an essential part of the Laramie River System of the claimant for regulating the flow of water through said system and to the Cache la Poudre River. The said reservoir is not as yet constructed, but it is intended to be constructed as follows: Area at high water line 11 acres, depth of water to be stored 40 feet and estimated storage and regulating capacity 19,166,000 cubic feet.

It is hereby adjudged and decreed that said reservoir be given Reservoir Priority No. 10, of date August 25, 1902, provided it be shown in a proper proceeding that said reservoir has been completed and water has been diverted and applied thereby to the irrigation of lands within a rea-

sonable time, but in no case shall the amount decreed said reservoir exceed a storage depth of 40 feet above the bottom of the outlet tube and a capacity of 19,166,000 cubic feet.

Reservoir No. 12.—Link Lake Reservoir No. 8 of the Laramie River System

That said reservoir, as set forth in the findings herein, is entitled to Reservoir Priority No. 11. It is claimed by The Greeley-Poudre Irrigation District, a corporation. It is located in Larimer County, Colorado, upon a the S½ of Section 4, Township 8 North, Range 76 West of the 6th P. M. It will be constructed across a branch of Rawah Creek and has no inlet ditch, said creek serving to convey water to said reservoir. Rawah Creek is used to convey waters from its outlet to the Laramie River Tunnel, by way of The Rawah Ditch or The Rawah & Lower Supply [fol. 2916] Ditch of claimant. It derives its supply of water from said branch of Rawah Creek, being that portion of said stream lying between the crest of the Medicine Bow range of mountains and said reservoir. This reservoir is intended to be used for the storage of water for irrigation, and, also, as an essential part of the Laramie River System of the claimant for regulating the flow of water through said system and to the Cache la Poudre River. The said reservoir is not as yet constructed, but it is intended to be constructed as follows: Area at high water line 50 acres, depth of water to be stored 40 feet and estimated storage and regulating capacity 87,120,000 cubic feet.

It is hereby adjudged and decreed that said reservoir be given Reservoir Priority No. 11, of date August 25, 1902, provided it be shown in a proper proceeding that said reservoir has been completed and water has been diverted and applied thereby to the irrigation of lands within a reasonable time, but in no case shall the amount decreed said reservoir exceed a storage depth of 40 feet above the bottom of the outlet tube and a capacity of 87,120,000 cubic feet.

Reservoir No. 13.—Link Lake Reservoir No. 9 of the Laramie River System

That said reservoir, as set forth in the findings herein, is entitled to Reservoir Priority No. 12. It is claimed by

The Greeley-Poudre Irrigation District, a corporation. It is located in Larimer County, Colorado, upon the NE¼ of Section 6, Township 8 North, Range 76 West of the 6th P. M. It will be constructed across a branch of Rawah Creek and has no inlet ditch, said creek serving to convey [fol. 2917] water to said reservoir. Rawah Creek is used to convey waters from its outlet to the Laramie River Tunnel, by way of The Rawah Ditch or The Rawah & Lower Supply Ditch of claimant. It derives its supply of water from said branch of Rawah Creek, being that portion of said stream lying between the crest of the Medicine Bow range of mountains and said reservoir. This reservoir is intended to be used for the storage of water for irrigation, and, also, as an essential part of the Laramie River System and to the Cache la Poudre River. The said reservoir is not as yet constructed, but it is intended to be constructed as follows: Area at high water line 25 acres, depth of water to be stored 40 feet and estimated storage and regulating capacity 25,000,000 cubic feet.

It is hereby adjudged and decreed that said reservoir be given Reservoir Priority No. 12, of date August 25, 1902, provided it be shown in a proper proceeding that said reservoir has been completed and water has been diverted and applied thereby to the irrigation of lands within a reasonable time, but in no case shall the amount decreed said reservoir exceed a storage depth of 40 feet above the bottom of the outlet tube and a capacity of 25,000,000 cubic feet.

Reservoir No. 14.—Link Lakes Reservoir No. 10 of the Laramie River System

That said reservoir, as set forth in the findings herein, is entitled to Reservoir Priority No. 13. It is claimed by The Greeley-Poudre Irrigation District, a corporation. It is located in Larimer County, Colorado, upon the NE¼ of Section 31, Township 9 North, Range 76 West of the 6th P. M. It will be constructed across McIntyre Creek and has no inlet ditch, said creeks serving to convey water [fol. 2918] to said reservoir. McIntyre and Rawah Creeks are used to convey waters from its outlet to the Laramie River Tunnel, by way of the McIntyre Ditch and the Rawah Ditch or The Rawah & Lower Supply Ditch of claimant. It derives its supply of water from said McIntyre Creek, be-

ing that portion of said stream lying between the crest of the Medicine Bow range of mountains and said reservoir. This reservoir is intended to be used for the storage of water for irrigation, and, also, as an essential part of the Laramie River System of the claimant for regulating the flow of water through said system and the Cache la Poudre River. The said reservoir is not as yet constructed, but it is intended to be constructed as follows: Area at high water line 14 acres, depth of water to be stored 30 feet and estimated storage and regulating capacity 18,500,000 cubic feet.

It is hereby adjudged and decreed that said reservoir be given Reservoir Priority No. 13, of date August 25, 1902, provided it be shown in a proper proceeding that said reservoir has been completed and water has been diverted and applied thereby to the irrigation of lands within a reasonable time, but in no case shall the amount decreed said reservoir exceed a storage depth of 30 feet above the bottom of the outlet tube and a capacity of 18,500,000 cubic feet.

Reservoir No. 15.—Link Lake Reservoir No. 11 of the Laramie River System

That said reservoir, as set forth in the findings herein, is entitled to Reservoir Priority No. 14. It is claimed by The Greeley-Poudre Irrigation District, a corporation. It is located in Larimer County, Colorado, upon the SW¼ of Section 31, Township 9 North, Range 76 West of the 6th P. M. It will be constructed across McIntyre Creek and has [fol. 2919] no inlet ditch, said creeks serving to convey water to said reservoir. McIntyre and Rawah Creeks are used to convey waters from its outlet to the Laramie River Tunnel, by way of the McIntyre Ditch and the Rawah Ditch or the Rawah and Lower Supply Ditch of claimant. It derives its supply of water from said McIntyre Creek, being that portion of said stream lying between the crest of the Medicine Bow range of mountains and said reservoir. This reservoir is intended to be used for the storage of water for irrigation, and, also, as an essential part of the Laramie River System of the claimant for regulating the flow of water through said system and to the Cache la Poudre River. The said reservoir is not as yet constructed, but it is intended to be constructed as follows: Area at high

water line 35 acres, depth of water to be stored 35 feet and estimated storage and regulating capacity 50,000,000 cubic feet.

It is hereby adjudged and decreed that said reservoir be given Reservoir Priority No. 14, of date August 25, 1902, provided it be shown in a proper proceeding that said reservoir has been completed and water has been diverted and applied thereby to the irrigation of lands within a reasonable time, but in no case shall the amount decreed said reservoir exceed a storage depth of 35 feet and estimated storage and regulating capacity of 50,000,000 cubic feet.

Reservoir No. 16—Link Lake Reservoir No. 12. of the Laramie River System

That said reservoir, as set forth in the findings herein, is entitled to Reservoir Priority No. 15. It is claimed by The Greeley-Poudre Irrigation District, a corporation. It is located in Larimer County, Colorado, upon the NW¼ of Section 4, Township 8 North, Range 76 West of the 6th P. M. It will be constructed across a branch of Rawah Creek and [fol. 2920] has no inlet ditch, said creek serving to convey water to said reservoir. Rawah Creek is used to convey waters from its outlet to the Laramie River Tunnel, by way of The Rawah & Lower Supply Ditch of claimant. It derives its supply of water from said branch of Rawah Creek, being that portion of said stream lying between the crest of the Medicine Bow range of mountains and said reservoir. This reservoir is intended to be used for the storage of water for irrigation, and, also as an essential part of the Laramie River System of the claimant for regulating the flow of water through said system and to the Cache la Poudre River. The said reservoir is not as yet constructed, but it is intended to be constructed as follows: Area at high water line 14 acres, depth of water to be stored 10 feet, and estimated storage and regulating capacity 6,000,000 cubic feet.

It is hereby adjudged and decreed that said reservoir be given Reservoir Priority No. 15, of date August 25, 1902, provided it be shown in a proper proceeding that said reservoir has been completed and water has been diverted and applied thereby to the irrigation of lands within a reasonable time, but in no case shall the amount decreed said reservoir exceed a storage depth of 10 feet above the bottom of the outlet tube and a capacity of 6,000,000 cubic feet.

Reservoir No. 17—Link Lake Reservoir No. 13 of the Laramie River System

That said reservoir, as set forth in the findings herein, is entitled to Reservoir Priority No. 16. It is claimed by The [fol. 2921] Greeley-Poudre Irrigation District, a corporation. It is located in Larimer County, Colorado, upon the NE¼ of Section 29, Township 9 North, Range 76 West of the 6th P. M. It will be constructed across a branch of Rawah Creek and has no inlet ditch, said creek serving to convey water to said reservoir. Rawah Creek is used to convey waters from its outlet to the Laramie River Tunnel, by way of The Rawah & Lower Supply Ditch of claimant. It derives its supply of water from said branch of Rawah Creek, being that portion of said stream lying between the crest of the Medicine Bow range of mountains and said reservoir. This reservoir is intended to be used for the storage of water for irrigation, and, also, as an essential part of the Laramie River System of the claimant for regulating the flow of water through said system and to the Cache la Poudre River. The said reservoir is not as yet constructed, but it is intended to be constructed as follows: Area at high water line 60 acres, depth of water to be stored 10 feet and estimated storage and regulating capacity 26,000,000 cubic feet.

It is hereby adjudged and decreed that said reservoir be given Reservoir Priority No. 16, of date August 25, 1902, provided it be shown in a proper proceeding that said reservoir has been completed and water has been diverted and applied thereby to the irrigation of lands within a reasonable time, but in no case shall the amount decreed said reservoir exceed a storage depth of 10 feet above the bottom of the outlet tube and a capacity of 26,000,000 cubic feet.

[fol. 2922] Reservoir No. 18—Link Lake Reservoir No. 14 of the Laramie River System

That said reservoir, as set forth in the findings herein, is entitled to Reservoir Priority No. 17. It is claimed by the Greeley-Poudre Irrigation District, a corporation. It is located in Larimer County, Colorado, upon the NE¼ of Section 29, Township 9 North, Range 76 West of the 6th P. M. It will be constructed across Spring Creek, a branch and tributary of Rawah Creek and has no inlet ditch, said creek serving to convey water to said reservoir. Rawah Creek

is used to convey waters from its oulet to the Laramie River Tunnel, by way of The Rawah & Lower Supply Ditch of claimant. It derives its supply of water from said Spring Creek, being that portion of said stream lying between the head waters thereof and said reservoir. This reservoir is intended to be used for the storage of water for irrigation, and, also, as an essential part of the Laramie River System of the claimant for regulating the flow of water through said system and to the Cache la Poudre River. The said reservoir is not as yet constructed, but it is intended to be constructed as follows: Area at high water line 50 acres, depth of water to be stored 12 feet and estimated storage and regulating capacity 26,000,000 cubic feet.

It is hereby adjudged and decreed that said reservoir be given Reservoir Priority No. 17, of date August 25, 1902, provided it be shown in a proper proceeding that said reservoir has been completed and water has been diverted and applied thereby to the irrigation of lands within a reasonable time, but in no case shall the amount decreed said reservoir exceed a storage depth of 12 feet above the bottom of the outlet tube and a capacity of 26,000,000 cubic feet.

[fol. 2923] No. 19—The Tunnel Reservoir of the Laramie River System

That said reservoir, as set forth in the findings herein, is entitled to no special priority, but shall for all purposes be considered in the nature of a regulation or expansion basin for the better regulation and discharge of the flow of the waters of the Laramie River System of The Greeley-Poudre Irrigation District into the Laramie River Tunnel. It is located in Larimer County, Colorado, upon portions of Sections Six (6) and Seven (7), Township Eight (8) North, Range Seventy-five (75) West of the 6th P. M. and Section One (1), Township Eight (8) North, Range Seventy-six (76) West of the 6th P. M. It is in process of construction across the valley of the Laramie River, its dam being located immediately below the mouth of the West Fork of said stream. The Rawah Ditch, The Lower Rawah and Supply Ditch and The Deadman and Nunn Creek Ditch are each and all used for the conveyances of water from the various portions of the system of the claimant, The Greeley-Poudre Irrigation District, to said Tunnel Reservoir for regulation, accumulation and discharge into and through

the Laramie River Tunnel. It also intercepts and diverts water of both the Laramie River and West Fork without the aid of either of the ditches aforesaid. Said reservoir is not yet complete, but when constructed as planned, will cover about 217 acres at high water line and will be capable of regulating the flow of water to it delivered and by it intercepted and diverted to a depth of 33 feet and will have an estimated regulating capacity of 170,000,000 cubic feet.

Said reservoir will not be awarded separate decree as a storage reservoir, but it is hereby adjudged and decreed that it shall at all times be considered as a part and unit of the Laramie River System of the claimant for the uses [fol. 2924] and purposes aforesaid without special priority number, but of the same date as the remainder of said system, provided, however, the said reservoir be completed within reasonable time and water thereafter diverted and regulated and therefrom discharged by means of the Laramie River Tunnel into the Cache la Poudre River and thereafter applied for the irrigation of lands.

Reservoir No. 20—The Laramie River Reservoir

That said reservoir, as set forth in the findings herein, is entitled to Reservoir Priority No. 18. It is claimed by The Greeley-Poudre Irrigation District, a corporation. It is located in Larimer County, Colorado, upon portions of Sections one (1), Two (2), Three (3), Eleven (11), Twelve (12) and Fourteen (14), Township Nine (9) North, Range Seventy-six (76) West, and Section Thirty-five (35), Township Ten (10) North, Range Seventy-six (76) West of the 6th P. M. It will be constructed across the Laramie River and has no inlet ditch, said river and its tributaries serving to convey water to said reservoir, from which stream and tributaries its water supply is derived. It is intended to be used for the storage of water for irrigation and, also as a basin for the regulation of the flow of the water of the Laramie River in such a manner as to permit the greatest beneficial use thereof to all appropriators diverting water from said river below the said reservoir. It is not as yet completed, but, when constructed, is intended to be as follows: Area at high water line about 1200 acres, storage depth 80 feet and storage capacity 1,940,000,000 cubic feet. [fol. 2925] It is hereby adjudged and decreed that said reservoir be given Reservoir Priority Numbered 18, of date

April 6, 1908, provided it be shown in a proper proceeding that said reservoir has been completed and water has been diverted, stored and applied to a beneficial use thereby within a reasonable time, but in no case shall the amount decreed said reservoir exceed a storage depth of 80 feet above the bottom of the outlet tube and a capacity of 1,940,000,000 cubic feet.

And it is further ordered, adjudged and decreed that each and every of the appropriations of water herein found and adjudged to have been made from the waters of the said Big Laramie River and of its several tributaries, herein named, and given priority numbers according to their several dates of appropriation by construction or enlargement as set forth in this decree, are to be taken, held and enjoyed for the uses and purposes, and subject to the conditions in this decree set forth and in order of priority as herein determined; and

It is further ordered, adjudged and decreed that the owners of said ditches, tunnel and reservoirs be permitted to use and enjoy the appropriations of water therefor, during the times, in the order of the several priorities, and in the manner herein set forth and that all water Commissioners, their deputies and assistants, and all other officials, whose duty it is or may be to make or cause to be made distribution of water for irrigation in Water District No. 48, shall at all times observe, maintain and enforce the aforesaid decree and distribute water in accordance with the provisions thereof.

Done in open Court this 20th day of February, A. D. 1914.
By the Court.

Neil F. Graham, Judge.

[fol. 2926]

STATE OF COLORADO,
County of Larimer, ss:

I, W. P. Hurley, Clerk of the District Court, of the Eighth Judicial District of the State of Colorado within and for Larimer County, do hereby certify the foregoing to be a true, perfect and complete copy of Findings and Decree "In the Matter of the Adjudication of Priorities of Water Rights in Irrigation District No. 48, of the State of Colorado, for Irrigation and Other Beneficial Uses," in Case No. 2725, entered on the 20th day of February, A. D. 1914

In testimony whereof I have hereunto set my hand and
affixed the seal of said Court, at my office in Fort Collins
Colorado, this 23rd day of May, A. D. 1933.

W. P. Hurley, Clerk. (Seal.)

State of Colorado,
County of Larimer, ss:

I, Claude C. Coffin, Judge of the District Court of the
Eighth Judicial District of the State of Colorado within and
for the County of Larimer, do hereby certify that W. P.
Hurley, whose name is subscribed to the foregoing Certifi-
cate of Attestation, now is, and was, at the time of signing
and attesting the same, Clerk of the District Court of Larimer
County aforesaid, and keeper of the Records and seal thereof,
duly appointed and qualified to office; that full faith and
credit are and of right ought to be given to all his official acts
as such in all Courts of Record and elsewhere; and that his
said attestation is in due form of law, and by the proper
officer.

Given under my hand and seal this 23rd day of May, A. D.
1933.

Claude C. Coffin. (Seal)

State of Colorado,
County of Larimer, ss:

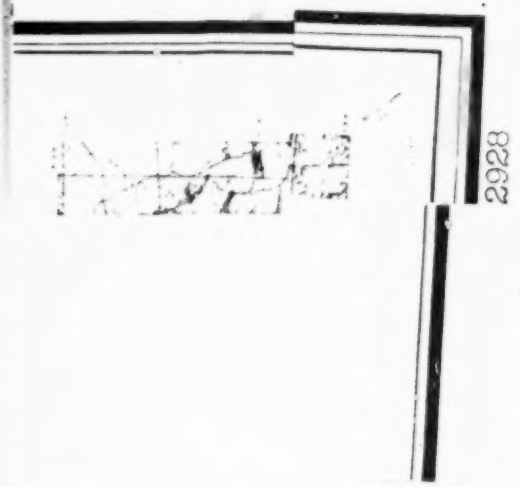
I, W. P. Hurley, Clerk of the District Court of the Eighth
Judicial District of the State of Colorado, within and for
Larimer County, do hereby certify that —— ——, whose
official signature is appended to the foregoing certificate,
was, at the time of signing the same, Judge of the District
Court of Larimer County, of the State of Colorado, duly
commissioned and qualified; that full faith and credit are
and of right ought to be given to all his official acts as such
in all Courts of Record, and elsewhere.

In testimony whereof, I have hereunto set my hand and
affixed the seal of said Court, at my office in Fort Collins
Colo., this 23rd day of May, A. D. 1933.

W. P. Hurley, Clerk. (Seal)

2927 DEFENDANT'S EXHIBIT I

Here follows photolithograph of map, Defendant's
Exhibit I, side folio 2928)



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(Exhibit 1, side folio 2928)

[fol. 2929] DEFENDANT'S EXHIBIT J

United States Department of the Interior General Land Office

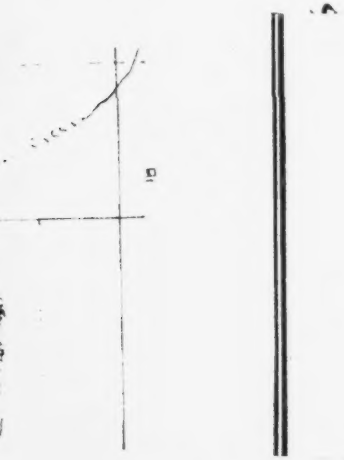
United States Land Office,

Denver, Colorado.

May 25, 1933.

This is to certify that the maps hereto attached, being one map of the Laramie Tunnel Ditches and Feeders approved March 29, 1909, and one map of the Laramie Tunnel Ditches and Feeders in three sections, approved May 5, 1924, are true and correct copies of the only maps found on file in the United States Land Office at Denver, Colorado, in connection with these projects.

Walter Spencer, Register.



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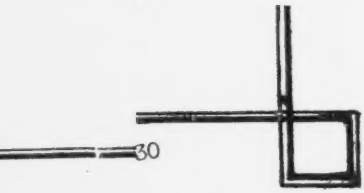


DEFENDANT'S EXHIBIT K

STATE OF COLORADO

UNITED STATES OF AMERICA, } ss.
STATE OF COLORADO. }

CERTIFICATE.

I, Chas. M. Armstrong, Secretary of State of the State of Colorado, do hereby certify that the annexed is a full, true and complete copy of

CERTIFICATE OF INCORPORATION

-of-

LARIMER COUNTY WATER SUPPLY COMPANY

which was filed in this office on the EIGHTEENTH day of JANUARY, A. D. 1878, at 10:20 o'clock A. M. and admitted to record.....

.....IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the Great Seal of the State of Colorado, at the City of Denver, this -----TWENTY-THIRD----- day of -----MAY---------- A.D. -1933-

Chas. M. Armstrong SECRETARY OF STATE

BY A. J. Snedeker DEPUTY

2932-2933

Certificate of Incorporation

We William C. Stover Francis L. Carter and Lucien W. Bliss Citizens of the State of Colorado desirous of forming a Company to encourage and promote the industrial pursuits of the State of Colorado hereby certify that we have organized ourselves and are associated into a body politic and corporate to construct operate and maintain a Ditch and Flume or Flumes over the route and for the purposes hereinafter named as follows to wit

1st The name of said Company shall be the Larimer County Water Supply Company

2nd The Capital stock of said Company shall be Twenty five thousand dollars

3rd The number of shares of said stock shall be one thousand each share to be of the par value of twenty five dollars

4th The number of Directors shall be three William C. Stover Francis L. Carter and Lucien W. Bliss shall be the Directors of said Company for the first year of its existence

5th The term of said Companys existence shall be twenty (20) years from date hereof

6th The principal office of said Company shall be at Fort Collins in the County of Larimer and State of Colorado and the principal business thereof shall be carried on in Larimer County in said State

7th The objects of said Company are to construct operate and maintain a Flume or Flumes and Ditch and to convey water through the same and along the

1408

and use of the same for mining milling manufacturing
irrigating Power Domestic and Domestic purposes.

The water to be conveyed through said Flumes and
Ditch shall be taken from the stream of water known as the
Cache La Poudre river and shall be taken from the said
stream on the north bank thereof at or near the place
where said stream intersects the north line of section
fourteen (14) of Township eight (8) north range seventy
(70) west of the sixth (6) principal meridian in Larimer
County in the State of Colorado and from said point as
the head of the said Flumes or Ditch shall run on the
north bank of said stream to the mouth of the Cannon
thence to the north and east of Pleasant Valley on the
south slope of the hill to a point at or near the quarter
section corner on the south line of section thirteen
(13) Township eight (8) north range seventy (70) west
of the sixth (6) principal meridian thence on the south
slope of the hill being the north or left bank of the
Cache La Poudre river to a point at or near the south
east corner of section thirteen (13) Township eight (8)
north range seventy (70) west thence by the most prac-
ticable route to a point at or near the centre of section
eighteen (18) Township eight (8) north range sixty
nine (69) west of sixth (6) principal meridian
Thence by the most practicable route with a fall
not to exceed ten (10) feet in the mile through Townships
eight (8) north range sixty nine (69) west eight (8)
north range sixty eight (68) west Township nine (9)

1109

north range sixty nine (69) west or township nine (9) north range sixty eight (68) west with the right to construct and maintain such other lateral or branch Ditches as the Company may deem necessary to the successful operation of its business

9th The Directors of said Company shall have the power to make such prudential By laws as they may deem necessary for the control and management of the affairs of said Company and the meeting of the stockholders or of the Directors shall be held at the town of Fort Collins in the county of Larimer in the State of Colorado The said Company shall have power to condemn and take for its right of way purposes a strip of land along the line or route aforesaid not exceeding fifty (50) feet in width and the intent hereof to construct the said work by Flume or Flumes over such part or parts of said route as are not practicable for the construction of a Ditch to be determined by the Directors of said Company

In witness whereof we have hereunto set and to two (2) other certificates the same in all respects as this subscribed our names and affixed our seals this sixteenth (16th) day of January in the year of our Lord one thousand eight hundred and seventy eight

William E Stover

Francis L Carter

Lucien W Bliss

2936

State of Colorado
County of Larimer } ss

I Charles P Scott County Clerk in and for said County in the State aforesaid do hereby certify that William C Stover Francis C Carter and Lucien W Bliss personally known to me to be the same persons whose names are subscribed to the above and foregoing Certificate of Incorporation, appeared before me this day in person and acknowledged that they signed sealed and delivered the said instrument of writing as their free and voluntary act for the uses and purposes therein set forth.

Given under my hand and official seal this Sixteenth (16th) day of January AD 1878.

Chas P Scott
County Clerk

DOMESTIC No. 1596

Darmer Co. Water Supply Company.

Filed in this office the 18th day of January, 1878, at 10 A.M. and recorded in Book A. Page 519

Jeremy M. Clark
Secy of State.
B.

DEFE[illegible] EXHIBIT L

STATE OF COLORADO

UNITED STATES OF AMERICA, } ss.
STATE OF COLORADO. }

CERTIFICATE.

I, Chas. M. Armstrong, Secretary of State of the State of Colorado, do hereby certify that the annexed is a full, true and complete copy of

CERTIFICATE OF INCORPORATION

-of-

THE LARIMER COUNTY RESERVOIR IRRIGATING COMPANY

which was filed in this office on the TWELFTH day of FEBRUARY, A. D. 1878, at 9:50 o'clock A. M. and admitted to record.....

..... IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the Great Seal of the State of Colorado, at the City of Denver, this ----TWENTY-THIRD---- day of ----MAY---- A.D.-19[illegible]

Chas. M. Armstrong
SECRETARY OF STATE

BY A. G. Suedeker
DEPUTY

Know All Men by these presents that we Ledru R. Rhodes, Thomas Macon, Ebenezer T. Wells & Edmund L. Smith, _____

_____

_____

desiring to form a Company for the purposes hereinafter specified do hereby, in pursuance of the several statutes of the State of Colorado, in such case made and provided, associate ourselves as a body corporate and declare;

I. That the name of such corporation shall be the Larimer County Reservoir Irrigating Company.

II. The objects for which said corporation is created are to survey, construct and maintain a ditch or canal which shall take water from the Cache à la Poudre River or Creek in Larimer County, State of Colorado; said ditch commencing and taking the water from said creek on the South side thereof at a point near the village of La Porte, and about fifty feet above the ditch heretofore constructed by the Larimer County Land Improvement Company, known as Canal No. Two, thence by the most eligible line, keeping above said Canal No. Two to the high ground above and northerly from a certain natural basin or depression commonly called Warren's Lake and which is upon Section Thirty Six in Township No. Seven North Range Sixty Nine (69) West, in said Larimer County, and lands adjacent; thence to and into said basin; and by means of said ditch to divert and discharge the waters of said stream into said basin so as to fill the same, until the water shall rise to the level of the lower embankment of said Canal No. Two; and from time to time to fill and keep full the said basin and discharge the waters therefrom, as the same shall be needed for the purpose of irrigation as hereinafter specified,

and to construct and maintain proper dikes, embankments and other proper works to retain and store the waters so discharged into said basin; and to construct and maintain another ditch or canal leading from said basin at the lower part thereof running from said basin by the most eligible route to and upon lands to be irrigated from said basin or reservoir and thence, and at other points along said last mentioned ditch or canal, by means of said ditch or canal and proper gates, sluices, sluice ways and other means to discharge the waters out of said basin and convey and distribute the same along the line of said ditch from time to time as the same shall be needed for the irrigation of the lands below said basin and in the vicinity of said ditch or ditches leading therefrom and for sale to the owners of such lands in that vicinity for the irrigation of said lands in order to the cultivation thereof.

III. The capital stock of said corporation shall be Ten Thousand Dollars; and shall consist of one hundred shares.

IV. The term of existence of said corporation shall be twenty years.

V. The business, property and affairs of said corporation shall be managed by three trustees; the names of three who shall manage its affairs for the first year of its existence are Ledru P. Rhodes, Thomas Macon and Ebenezer T. Wells.

VI. The principal office of said company shall be kept at Fort Collins, in the County of Larimer, and State of Colorado, and its principal business will be carried on at said County of Larimer.

VII. The trustees of said corporation shall have power to make such prudential bye-laws as they may deem proper, not incon-

sistent with the laws of this State, for the management of the affairs of said company.

Leslie R Rhodes

Thomas. Macem

Ebenezer T. Wells

Edmund L. Smith

State of Colorado
Arapahoe County } ss.

Before the undersigned a Notary Public in and for said County this day personally came Leslie R. Rhodes, Thomas Macem, Ebenezer T. Wells and Edmund L. Smith, personally known to me to be the same persons described in and who executed the above certificate and severally acknowledged that they had executed the same for the uses, intents and purposes therein mentioned.

In Witness Whereof I have set my hand and affix my seal Notarial this Eleventh day of February A.D. 1878.

THOMAS M. O'BRIEN. NOTARY PUBLIC. ARAPAHOE CO., COLORADO.

Thomas M. O'Brien,
Notary Public.

Larimer County
Reservoir Irrigating
Co.

DOMESTIC No. 1622

Filed in Secy's Office this
17th day of Feby, 1878,
at 9.50 A.M. and recorded
in Book A. Page 572.

Jas M. Clark,
Secy of State.
B.

✓

Paid

DEFENDANT'S EXHIBIT M

STATE OF COLORADO

UNITED STATES OF AMERICA, } ss. CERTIFICATE.
STATE OF COLORADO.

I, [illegible], Secretary of State of the State of Colorado, do hereby certify that

the annexed is a full, true and complete copy of

CERTIFICATE OF INCORPORATION

-of-

THE LARIMER COUNTY DITCH COMPANY

which was filed in this office on the TWENTY-SIXTH day of FEBRUARY, A. D. 1861, at 9:00 o'clock A. M. and admitted to record.....

In TESTIMONY WHEREOF I have hereunto set my hand and affixed the Great Seal of the State of Colorado at the City of Denver, this TWENTY-THIRD day of MAY, A.D. 1933.

[signature] SECRETARY OF STATE

[signature] DEPUTY

2944

842

Certificate of Incorporation

The Larimer County Ditch Company

Know All Men by these Presents:

That the undersigned Noah Bristol, Abraham L. Enigh, Edgar Avery, ~~William H. Avery~~ and Franklin C. Avery have and hereby do associate themselves together as a corporation under and by virtue of the laws of the State of Colorado and do hereby certify and declare

I First — That the corporate name of said Company is and shall be The Larimer County Ditch Company.

II Second — That the objects for which said Company is created are and shall be to construct, operate and maintain a ditch, taking water from the Cache La Poudre river for irrigation, agricultural, domestic, mechanical and piscatorial purposes; also to construct and maintain reservoirs on and near the line of said ditch, and to store water ~~therein~~ for the purposes aforesaid or any of them; Also to sell, lease and dispose of water rights in said ditch and the water flowing therein, and stored in its reservoirs, either in whole or in part, to any person or persons owning or occupying lands under said ditch to be used for the purposes aforesaid

or any of them; also to acquire by purchase, lease, condemnation, devise, gift or otherwise, lands lying along the proposed course and lands capable of irrigation from said Ditch when constructed; Also to purchase water and the right to use water for said ditch; Also to divert into said Ditch all water flowing and to flow in the Cache La Poudre River not otherwise appropriated which may be necessary to supply said ditch and reservoirs with water for the uses aforesaid; Also to construct a dam or dams in the Cache La Poudre River to divert water as aforesaid.

III Third— That the stream from the water is to be taken is and shall be the Cache La Poudre river.

IV Fourth— That the point or place on said stream at or near which the water is to be taken and shall be the point on the north side of said river about two and one half (2½) miles above La Porte in Larimer County Colorado, where the old "Abenchain Mill Race" commonly so called leaves the Cache La Poudre river.

V Fifth— That the line of said Ditch as near as may be stated shall be as follows: Commencing at said North Bank of the Cache La Poudre river at the point

aforesaid, running thence in an easterly direction on a grade of not less than one foot and not more than five feet to the mile as far as the Box Elder Creek in Larimer County Colorado, a distance of twenty miles more or less.

VI Sixth- That the use to which said water is to be applied is for irrigation, agricultural, domestic mechanical, and Municipal purposes as aforesaid, but chiefly for irrigating lands lying under said Ditch

VII Seventh- That the amount of Capital Stock of said Company shall be thirty thousand (30000) Dollars, which shall consist of three hundred (300) shares of the par value of one hundred (100) Dollars each.

VIII Eighth- That the term of existence of said corporation shall be twenty years.

IX Ninth- That the number of Trustees of said corporation shall be five, and the names of the Trustees who shall manage the affairs of such Company for the first year of its existence are and shall be Noah Bristol Abraham L. Enright, Franklin O. Avery Edgar Avery and William H. Avery.

X Tenth- That the town and County in which the principal office

of the company shall be kept in Fort Collins in the County of Larimer and the State of Colorado, and the name of the County in which the principal business of the corporation shall be carried on is and shall be Larimer County in said State.

XI Eleventh— That the Board of Trustees of said Corporation shall have power to make such prudential by-laws as they deem proper for the management of the affairs of the Company not inconsistent with the laws of this State for the purpose of carrying on all kinds of business within the objects and purpose of such Company.

Witness the hands and seals of said Incorporators this 25th day of February A D 1881 in duplicate.

Noah L Bristol (Seal)
Abraham L Tinsley (Seal)
Edgar Avery (Seal)
Franklin C Avery (Seal)

State of Colorado
County of Larimer } ss I, Harry N. Haynes a Notary Public in and for said County in the State aforesaid do hereby certify that Franklin C Avery Abraham L. Tinsley, Noah L Bristol and Edgar Avery personally known to me to be the same persons who

signed and sealed the above certificate of Incorporation appeared before me this day in person and severally acknowledged that they each signed sealed and delivered said Certificate of Incorporation as their free and voluntary act and deed for the uses and purposes therein set forth.

Witness my hand and Notarial seal this 25th day of February A.D. 1881.

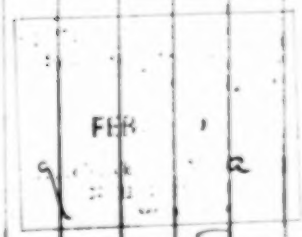
Harry H. Haynes
Notary Public

3440

Certificate of Incorporation

Of

The Larimer County Ditch Co



FEB

Recorded Book 7
Page 254

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2950

DEFENDANT'S EXHIBIT N

1425

STATE OF COLORADO

UNITED STATES OF AMERICA, STATE OF COLORADO. SS. **CERTIFICATE**

I, Chas. M. Armstrong, Secretary of State of the State of Colorado, do hereby certify that

the annexed is a full, true and complete copy of

CERTIFICATE OF INCORPORATION

-of-

THE WATER SUPPLY AND STORAGE COMPANY

which was filed in this office on the EIGHTH day of AUGUST, A. D. [illegible] at [illegible] o'clock P. M. and admitted to record.....

A L S O

[illegible] -of the- CERTIFICATE OF INCORPORATION

-of-

THE WATER SUPPLY AND STORAGE COMPANY

which were filed in this office on the following dates respectively, and admitted to record.....FOURTEENTH day of FEBRUARY, A. D. 1912 at [illegible] o'clock P. M.

FOURTEENTH day of FEBRUARY, A. D. 1933, at [illegible] o'clock P. M.....

In Testimony Whereof I have hereunto set my hand and affixed the Great Seal of the State of Colorado at the City of Denver this TWENTY-THIRD day of MAY A.D. 1933

Chas. M. Armstrong
SECRETARY OF STATE

By A. Kindeker
DEPUTY

2951

State of Colorado,)
SS.
County of Larimer.)

I, S. C. Case, do hereby Certify that I am the duly elected and qualified Assessor of said County, that the Water Supply & Storage Company, a corporation duly organized and doing business under and by virtue of the laws of said state, is exempt from taxation in said County upon all of its irrigation rights, easements, franchises and ditch rights of way.

IN WITNESS thereof I have hereunto set my hand and seal this 27th, day of January A. D. 1908.

S. C. Case Seal

County Assessor

CERTIFICATE OF INCORPORATION

OF THE

WATER SUPPLY AND STORAGE COMPANY.

-------(o)-------

KNOW ALL MEN BY THESE PRESENTS, That the undersigned, Isaac W. Bennett, Isaac Thomas, Gus. A. Lyckman, John Hayden, Andrew L. Johnson, Alex. Mead, Clinton Farrar, Lorton B. Williams and Samuel B. Southard have associated themselves together, and hereby do associate themselves together for the purpose of becoming a body corporate under and by virtue of the laws of the State of Colorado, and in accordance with the provisions of the laws of said State, do hereby make, execute and acknowledge, in quadruplicate, this Certificate of Incorporation, and do hereby certify and declare:

FIRST--That the corporate name of this Company is and shall be "THE WATER SUPPLY AND STORAGE COMPANY."

SECOND--That the objects for which said Company is incorporated are and shall be to acquire by every lawful means an additional supply of water for irrigationfor the benefit of the owners of water rights in and from that certain irrigating canal known as The Larimer County Ditch, now owned and controlled by The Larimer County Ditch Company, situated in the counties of Larimer and Weld, and State of Colorado; and among other means for accomplishing said desired end, to enter upon, prosecute and maintain the following enterprises--

1st--To acquire and become the owner by purchase, condemnation or other lawful means all the ditches, water rights, appropriations, franchises and privileges of The Larimer Water Supply Company, and by means of said ditches, and by extending and further prosecuting the construction thereof, and by the construction of new ditches, to take, divert and appropriate as much as possible of the unappropriated waters of the Grand, Michigan and Laramie Rivers and streams and waters tributary thereto, and to conduct such water so diverted by means of a system of ditches and dams into the several branches and the main stream of the Cache-la-Poudre River; but not so as to raise the waters thereof above ordinary high-water mark; and to take the said water or an equivalent amount, making due allowance for evaporation and seepage, out again and through the headgate of The Larimer County Ditch, and into and along the said Ditch for distribution among its water-right owners

who are or shall become stockholders in this Company.

2nd--To acquire, by lease, purchase, condemnation or other lawful means, those certain natural basins commonly known and designated as Chambers Lake, Trap Lake, Lost Lake and Laramie Lake, in Larimer County, Colorado, and all the rights, appropriations of water, privileges and franchises of The Larimer County Reservoir Company in connection therewith; also, the dam heretofore constructed by The Larimer County Reservoir Company, and all the appliances connected therewith, and to construct a new dam where a breach lately occurred in the natural embankment of said Chambers Lake, and by means of said dams and other appliances, from time to time hereafter, with water heretofore appropriated for and which can be used for that purpose, and only with such water and other water which can be appropriated for such purpose, to fill said Chambers Lake and to store such water therein, and afterwards, from time to time, to conduct said water so stored from said reservoir, and also water which this Company appropriates and stores in said other lakes of which Lost Lake and Laramie Lake will be filled from the head waters of the Laramie River as appropriated heretofore by ditches heretofore constructed by the Larimer County Reservoir Company, into and along the Cache-la-Poudre River; but not so as to raise the water thereof above ordinary high water mark, and to take the said water or an equivalent amount, making due allowance for evaporation and seepage, out again at and through the headgate of The Larimer County Ditch, and into and along said Ditch to be distributed among the water-right owners thereof who are or shall become stockholders in this Company.

3rd--To acquire and become the owner by lease, purchase, condemnation or other lawful means of those certain natural basins or depressions adapted to the storage of water near the line of The Larimer County Ditch, known as Reservoirs Numbers 1, 2, 3, 4 and 5 of said Company (Number 5 being that certain natural basin or depression known as "Long Pond") and sufficient contiguous lands needed to construct necessary embankments for the storage and discharge of water in said depressions, and also for the convenient and economical management and care of the same; and to acquire in like manner other convenient reservoir sites suited for the storage of water and located in the counties of Larimer and Weld if at any time hereafter said Company shall regard it practicable and feasible to construct other reservoirs than those above particularly mentioned; and to erect necessary embankments, flumes, headgates, weirs and other appliances to render any or all the natural depressions to be acquired by this Company well adapted for reservoirs for the storage of water, with means for drawing water gradually therefrom as needed for irrigation purposes, and to fill any or all of said reservoirs with water heretofore appropriated for filling Reservoirs Numbers 2, 3 and 4, and also with water not otherwise appropriated, by means of the Larimer County Ditch or any other ditch now constructed or hereafter to be constructed as feeders for all or any of said reservoirs, to conduct water thereto from any available sources of supply.

4th--Wherever practicable, to use the water stored by this Company in any of its reservoirs directly for the purpose of supplying the water-right owners in and under the Larimer County Ditch who are or shall become stockholders in this Company with water for irrigation purposes, and where any reservoir or water supply of this Company is so located that its water cannot directly be used to supplement the water supply of the said Larimer County Ditch water-right owners, then to acquire the right, either by contract with other corporations or persons or by any other lawful means, to obtain in exchange for the water stored in any of the reservoirs of this Company, or otherwise supplied by it, other water in equivalent amount or in such quantities as can be obtained in lieu thereof; which water so acquired in exchange or in

tion of the stored or supplied water, shall be conducted into and along the Larimer County Ditch or any portion thereof for the benefit of its water-right owners as aforesaid; also, to acquire by purchase, lease, condemnation or other lawful means the right to convey water from said reservoirs to other ditches or through Dry Creek in Larimer County, or by other means, back to the Cache-la-Poudre River to be used in exchange as aforesaid.

5th--To acquire and become the owner by purchase, or any other lawful means, of any existing appropriation or appropriations of water, either from the Cache-la-Poudre River or from any streams tributary thereto, or from any source whatsoever, and wherever practicable, withdue regard to the rights of intervening appropriators, to use such purchased appropriations by conducting such waters into the Larimer County Ditch, or diverting the same at its headgate for the use of said water-right owners as aforesaid; also, the right to buy and sell lands, and to stock and cultivate the same.

6th--To acquire any waste, drainage, flood or subterranean waters, and to construct necessary ditches to conduct such waters into the Larimer County Ditch, or any of the reservoirs of this Company, as aforesaid.

7th--To manage, control, maintain, keep in repair and improve from time to time, all reservoirs, flumes, headgates, feeders, ditches, wasteways outlets and other property of said Company; and to superintend and control the filling of any of its reservoirs and the storage of water therein, the drawing of water therefrom, and the delivery of said water for irrigation purposes to those entitled thereto.

8th--To borrow money for any corporate purposes when deemed necessary or expedient, and to secure the payment of the same by deeds of trust or mortgages on any or all of the corporate property or franchises; to raise funds, when in the judgment of the Board of Directors, expedient, at any time, by the sale or transfer of any of its reservoir sites, or by the sale of any of its stored waters, and to use the money so acquired for any proper corporate purposes.

9th--To exercise all the powers incidental to thoseabove enumerated and by any lawful means whatever to increase the irrigation supply of the water-right owners in the Larimer County Ditch.

THIRD--That the streams from which water is to be taken and diverted by this Company are and shall be the Cache-la-Poudre River, the Grand River, the Michigan River, and the Laramie River, and the several head streams and branches thereof; Dry Creek and Box Elder Creek, in Larimer County, Colorado, and other natural streams available for the purposes mentioned.

FOURTH--That the points or places on said streamsat or near which water is to be taken, as near as may now be stated, are as follows: 1st--At the headgate of The Larimer County Ditch, as now and heretofore located, on the north bank of the Cache-la-Poudre River, in Larimer County, Colorado.

2nd--Those natural depressions known as Chambers Lake, Trap Lake, Lost Lake and Laramie Lake, supplied bydivers creeks and tributaries of the Cache-la-Poudre and Laramie Rivers, In Larimer County, Colorado.

3rd--At certain points on the several streams of the headwaters of the Grand River, in Grand County, Colorado, said points being located where a ditch known as North Ditch would cross said streams, the outlet of said ditch being in a low pass in the Continental Divide, in the north-west quarter of Section 21, township 6, North of Range 75 west, and about three and one-half miles in a north-easterly direction from the old town of Lulu, in Grand County, Colorado; said ditch having a heavy grade towards said pass, and by means of dams where it crosses said several streams to divert and convey the waters of said several streams along said ditch into and through the said pass, into one of the head streams of the South Fork of the Cache-la-Poudre River. Said North Ditch being about six miles in length from its point of beginning to its outlet in pass as aforesaid; also, at certain points on other head streams of the Grand River, in Grand County, Colorado, said points being located where a ditch known as South Ditch would cross said streams, the outlet of said ditch being identical with the outlet of said North Ditch in aforesaid pass; said South Ditch having a heavy grade towards said pass, and by means of dams where said ditch crosses said several streams, to divert and convey the waters of said streams along said ditch into and through the said pass; the course of said North Ditch being in a general north-easterly direction from its head to its outlet, and the course of said South Ditch being in a general northerly direction from its head to its outlet. The outlet of said ditches being at a point in said pass 1350 feet south 23° 30" east from the north-west corner of Section 21, township 6, north, range 75 west, in Larimer County, Colorado; whence the waters diverted from said several streams into and through said pass, are to be conducted by means of the natural channel of one of the branches of the South Fork, the South Fork, and the main Cache-la-Poudre River to the headgate of the Larimer CountyDitch.

4th--At certain points on the several streams of the headwaters of the Michigan River, in Larimer County, Colorado, said points being located where ditches would cross said streams, the outlet of said ditches being in what is known as Cameron Pass, said ditches having a heavy grade towards said Pass, and by means of dams where said ditches cross said several streams, to divert and convey the water of said several streams along said ditches into and through said Pass into Joe Wright Creek to Chambers Lake, and thence through the natural channel of the main Cache-la-Poudre River to the headgate of the Larimer County Ditch.

5th--At certain points in the several streams of the headwaters of the Laramie River, in Larimer County, Colorado: Said points being located where a ditch would cross said streams, the outlet of said ditch being on the divide between Chambers Lake and the Laramie River, said ditch having a heavy grade towards said outlet, and by means of dams where said ditch crosses said several streams to divert and convey the water of said several streams into and along said ditch to and through said outlet into Chambers Lake; to store the same from time to time therein when desired, and from thence through the natural channel of the Cache-la-Poudre River to the headgate of the Larimer County Ditch; the course of said ditch being in a general southerly direction and being from six to twelve miles in length from its head to its outlet at Chambers Lake.

FIFTH--The said ditches, above described, are designed to be constructed of sufficient capacity to convey all the waters of the said Grand, Michigan and Laramie Rivers at the several points of diversion.

SIXTH--The use to which the water acquired by this Company is intended to be applied is for the irrigation of agricultural lands lying in the counties of Larimer and Weld under the ditch of The Larimer County Ditch Company.

SEVENTH--The amount of capital stock of said Company shall be sixty thousand dollars, to be divided into six hundred shares of One Hundred Dollars each. The subscription to said stock shall be limited and confined to those persons and bodies only, and their successors in interest, who have acquired or are entitled to water rights from The Larimer County Ditch Company for irrigation purposes. Such subscribers shall be entitled to take stock in this Company upon the ratio of one share of stock herein to one water right in The Larimer County Ditch Company, as heretofore defined by said Company.

EIGHTH--That the term of existence of said Company shall be twenty years.

NINTH--The affairs and management of said corporation is to be under the control of a board of seven directors. I. W. Bennett, Edward H. Hall, John Hayden, Alexander Mead, F. C. Avery, A. A. Edwards and Asaph E. Mead are hereby selected to act as said Board of Directors and to manage the affairs of said corporation for the first year of its existence, and until their successors are duly elected by the stockholders and duly enter upon the discharge of their duties.

TENTH--The operations of said corporation will be carried on in the counties of Larimer, Grand and Weld, in the State of Colorado, and the principal place of business and office of said corporation shall be located in the city of Fort Collins, in the county of Larimer and State of Colorado.

ELEVENTH--The Board of Directors shall have power to make such prudential by-laws as they may deem proper for the management of the affairs of said corporation, not inconsistent with the laws of the State of Colorado, for the purpose of carrying on all kinds of business within the objects and purposes of said Company. Said by-laws, among other things, shall provide that the water which is supplied and diverted by means of the enterprise of this Company into the Larimer County Ditch or into any of the reservoirs of this Company shall only be delivered to and distributed among stockholders in this Company who shall then own and control water rights in The Larimer County Ditch Company.

IN TESTIMONY WHEREOF, The said corporators have hereunto set their hands and seals on this twenty-third day of July, A. D. 1891, in quadruplicate.

Isaac W. Barnett
Isaac Thomas
Geo A. Eyckman
John Hayden
Andrew L. Johnson
Alex Mead
Clinton Farrar
Morton R. Williams
Samuel H. Southard

State of Colorado,
County of Weld } ss.

I Adam C. Patton a Notary Public in and for said County, in the State aforesaid, do hereby certify that Morton R. Williams and Samuel H. Southard

personally known to me to be the persons whose names are subscribed to the annexed and foregoing certificate of incorporation, appeared before me this day in person and acknowledged that they signed, sealed, and delivered the said instrument of writing as their free and voluntary act for the uses and purposes therein set forth.

Given under my hand and notarial seal, this ..... day of July, A. D. 1891.

Adam C. Patton
Notary Public

My commission expires Aug 17 1893

ADAM C. PATTON NOTARY PUBLIC WELD COUNTY, COLORADO.

2959

State of Colorado, }
County of Larimer. } ss.

I, G. A. Webb, a Notary Public in and for said County, in the State aforesaid, do hereby certify that Isaac N. Bemath, Isaac Thomas, Gus. A. Lyckman, John Hayden, Andrew L. Johnson, Alex Mead & Clinton Farrar who are personally known to me to be the persons whose names are subscribed to the annexed and foregeing certificate of incorperation, appeared before me this day in person and acknowledged that they signed, sealed, and delivered the said instrument of writing as their free and voluntary act for the uses and purposes therein set forth.

Given under my hand and notarial seal, this 24th day of July A. D. 1891.

My Commission expires October 25th 1892

G. A. Webb

Notary Public

G. A. WEBB NOTARY PUBLIC LARIMER COUNTY, COLO.

2960

12392

CERTIFICATE OF INCORPORATION

OF THE

WATER SUPPLY AND STORAGE COMPANY.

DOMESTIC.

FILED in the office of the Secretary of State, of the State of Colorado, on the 8 day of Aug A. D. 1891, at 3 o'clock P. M. Recorded in Book 27 Page 465.

E. J. Eaton

Fees $10.00 pd

2961

CERTIFICATE OF RENEWAL AND EXTENSION OF THE TERM OF THE CORPORATE LIFE OF THE WATER SUPPLY AND STORAGE COMPANY, A CORPORATION, ORGANIZED AND EXISTING UNDER, AND BY VIRTUE, OF THE LAWS OF THE STATE OF COLORADO.

We, the undersigned, respectively the President, and Secretary of THE WATER SUPPLY AND STORAGE COMPANY, a corporation duly organized and existing under, and by virtue, of the laws of the State of Colorado, do hereby certify as follows, to-wit:

That heretofore and on Wednesday, December 27th, 1911, at the hour of 9 o'clock, at the offices of the said Company, No. 120, South College Avenue, Fort Collins, Colorado, a duly called, notified and published special meeting of the Stock Holders of THE WATER SUPPLY AND STORAGE COMPANY, was held, for the special purpose of considering and acting upon the special matter of a renewal or extension of the term of the corporate life of said Company.

That the term of the corporate life of said, THE WATER SUPPLY AND STORAGE COMPANY, expired July 23d, 1911, by limitation under its charter. That at such meeting the question of the renewal or extension of the corporate life of said Company for a period of Twenty (20) years from the date of the expiration or termination of the corporate life of said Company, was submitted to the vote of the Stock Holders of said Company. We do further certify that a majority of

1356

he stock of said Company was represented at said meeting; that he vote at said meeting was taken by ballot, as provided by aw, and that a majority of the entire outstanding Capital stock of said Company was voted by ballot in favor of a renewal of the term of the corporate life of said Company.

We, therefore, August C. Kauver, the President, and T. J. Gleasner, the Secretary of said Company, do hereby, under the seal of said Company, accordingly certify the fact, as provided in and by the terms and revisions of law in that behalf, and in pursuance of the provisions of Section 892 of the Revised Statutes of Colorado for the year 1908.

WITNESS our hands and the seal of said Corporation this the 6th day of January, 1913.

August C. Kauver
President of The Water Supply and Storage Company.

T. J. Gleasner.
Secretary of The Water Supply and Storage Company.

55740

CERTIFICATE OF RENEWAL AND EXTENSION OF THE CORPORATE LIFE OF THE WATER SUPPLY AND STORAGE COMPANY, A CORPORATION, ORGANIZED AND EXISTING UNDER, AND BY VIRTUE OF THE LAWS OF THE STATE OF COLORADO.

DOMESTIC

RECEIVED PAYMENT

FEB 14 1912

JAMES B. PEARCE, Sec'y of State

By [signature] Cashier.

FILED IN [illegible]
SECRETARY OF STATE
[illegible]

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Recorded by
[illegible]
2/26/12

Compared by
[illegible] McElroy

Indexed by
[illegible]

STATE OF COLORADO, }
County of Larimer, } ss.

TO WHOM IT MAY CONCERN:

This is to certify that a special meeting of the stockholders of The Water Supply and Storage Company, a Colorado corporation, was held at Fort Collins, Colorado, on the 11th day of January, A. D. 1933, such meeting having been called by the stockholders representing at least ten per cent (10%) of the entire capital stock of the company outstanding. Notice of such meeting, as provided by law, was published at least once not more than thirty days and at least ten days prior to the date fixed for said meeting in a newspaper printed at Fort Collins, State of Colorado, and notice of said meeting was delivered personally or mailed to each stockholder thirty (30) days prior to the date of such meeting, there being represented at such meeting three hundred ninety-three (393) shares of the capital stock of said company out of a total of six hundred (600) shares outstanding.

At said meeting a resolution was passed to extend the corporate existence of this said corporation perpetually from and after the date of the expiration of its corporate life, the resolution receiving a MAJORITY vote of all the outstanding stock of the corporation. The president and secretary were authorized to certify this resolution under the corporate seal of the company, to file such certificate

with the Secretary of State of the State of Colorado, and to file duplicate certificate under seal of the company in the office of the Recorder of Deeds in each county or counties wherein the company may do business in the State of Colorado, and in pursuance of such resolution, we do hereby certify the same under the seal of the company.

A C Kluver
President.

(Corporate Seal) Attest:

B S Tedmon
Secretary.

96128 O.N.

D-290-5

Certificate of Renewal

The Water Supply and Storage Company

Feb. 18, 1933
McWhite

DOMESTIC

FILED in the Office of the State Engineer
14 day February
A.D. 1933 at 4:00 P.M.
Alfred Deker
By Slater 32

2967

M

DEFENDANT'S EXHIBIT O

STATE OF COLORADO

UNITED STATES OF AMERICA, } ss.
STATE OF COLORADO.

CERTIFICATE.

I, Chas. M. Armstrong, Secretary of State of the State of Colorado, do hereby certify that the annexed is a full, true and complete copy of

CERTIFICATE OF INCORPORATION

-of-

THE DIVIDE DITCH COMPANY

which was filed in this office on the TWENTY-SECOND day of MAY, A. D. 1901, at 10:00 o'clock A.M. and admitted to record.

---000---

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the Great Seal of the State of Colorado, at the City of Denver this TWENTY-SIXTH day of MAY A.D. 1938

Chas. M. Armstrong SECRETARY OF STATE

By Alf Suedeker DEPUTY

KNOW ALL MEN BY THESE PRESENTS, That we, Bruce Eaton, Benj. H.Eaton and Rollin Q.Tenney, residents of the State of Colorado, have associated ourselves together as a company under the name and style of THE DIVIDE DITCH COMPANY? for the purpose of becoming a body corporate and politic under and by virtue of the laws of the State of Colorado, and in accordance with the provisions of the laws of said State we do hereby make, execute and acknowledge in triplicate this certificate in writing of our intention so to become a body corporate under and by virtue of said laws.

FIRST: The corporate name and style of our said company shall be THE DIVIDE DITCH COMPANY.

SECOND: The object for which our said company is formed is to construct and maintain a ditch for the carrying of the water appropriated by Philip Wilson under the name of The Wilson Supply Ditch taking water from Sand Creek in Larimer County, Colorado, as appears from filings in the office of the Clerk of said Larimer County under date of July 22nd, 1897.

THIRD: The capital stock of our said company is Fifty Thousand Dollars, to be divided into Five Hundred shares of One Hundred Dollars each.

FOURTH: The life of our said company shall be twenty years.

FIFTH: The affairs and management of our said Company shall be under the control of a board of directors consisting of three members and Bruce Eaton, Benj.H.Eaton and Rollin Q.Tenney are hereby selected to act as such directors and to manage the affairs and concerns of our said company for the first year of its existence and until their successors are duly elected and qualified.

SIXTH: The operations of our said company will be carried on in the counties of Weld and Larimer, in said State of

Colorado, and the principal place of business and business office of our said company shall be located in the town of Eaton, in the county of Weld, State of Colorado.

SEVENTH: The Directors of our said company shall have power to make such prudential by-laws for the management of the affairs of this company, not in contravention of the statutes of the State of Colorado, as in their judgment shall be proper.

IN WITNESS WHEREOF we have hereunto set our hands and seals this 12 day of April, A.D.1901.

Bruce T. Eaton .....(SEAL)

Benjamin H. Eaton ..... (SEAL)

Rollin Q. Tenney ..... (SEAL)

State of Colorado,

ss.

Larimer County.

I, Charles F.Davis, a notary public in and for said county, in the State aforesaid, do hereby certify that Rollin Q.Tenney, who is personally known to me to be the person whose name is subscribed to the foregoing certificate of incorporation, appeared before me this day in person, and acknowledged that he signed, sealed and delivered the said instrument of writing as his free and voluntary act, for the uses and purposes therein set forth.

Given under my hand and notarial seal this 12 day of April, A.D.1901

My commission expires Dec. 6th., 1904.

Charles F. Davis
notary Public

State of Colorado,

ss.

County of Weld.

I, William B. Grant a notary public in and for said county, in the State aforesaid, do hereby certify that Bruce Eaton and Benj.H.Eaton, who are personally known to me to be the persons whose names are subscribed to the foregoing certificate of incorporation, appeared before me this day in person, and acknowledged that they signed, sealed and delivered the said instrument of writing as their free and voluntary act, for the uses and purposes therein set forth.

Given under my hand and notarial seal this 13 day of ~~April~~ May A.D.1901.

My commission expires February 17, 1902

William B. Grant
notary public

32685

CERTIFICATE OF INCORPORATION

of

The Divide Ditch Company.

DOMESTIC.

FILED in the office of the Secretary of State of the State of Colorado on the 22 day of May A. D. 1901 at 10 o'clock A. M. Recorded in Book 88 Page 14

David A Mills
J. B. Eubanks

2971

1116

STATE OF COLORADO

UNITED STATES OF AMERICA, ss.
STATE OF COLORADO.

CERTIFICATE

I, [illegible], Secretary of State of the State of Colorado, do hereby certify that

[illegible]

[illegible]

[illegible]

[illegible]

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the Great Seal of the State of Colorado, at the City of Denver, this [illegible] day of [illegible] A.D. 1933.

SECRETARY OF STATE.

ARTICLES OF INCORPORATION
OF
THE DIVIDE CANAL AND RESERVOIR COMPANY.

KNOW ALL MEN BY THESE PRESENTS: That Benjamin H. Eaton, Bruce G. Eaton, and Ellis Smith, residents of the County of Weld and State of Colorado, have associated ourselves together, and do hereby associate ourselves together, under the name and style of THE DIVIDE CANAL AND RESERVOIR COMPANY for the purpose of becoming a body corporate and politic under and by virtue of the laws of the State of Colorado; and in accordance with the provisions of the laws of the said State, we do hereby make, execute and acknowledge, in triplicate, this certificate in writing, of our intention so to become a body corporate and politic under and by virtue of said laws, and in so doing, do hereby certify as follows:

I.

The corporate name and style of our said company shall be "THE DIVIDE CANAL AND RESERVOIR COMPANY."

II.

The business for which our said company is incorporated is as follows:

(a) For the purpose of taking, diverting, carrying, distributing, and making distribution of water for irrigation of lands, storage and other beneficial uses, from Deadman's Creek and its various branches; and Sand Creek and its branches. The said creeks being tributaries of the Laramie River in Larimer County, Colorado; it being the intent to take, divert and carry the said waters so appropriated by means of ditches and natural water-ways across the divide between the headwaters of the Laramie River and the Cache la Poudre River, and to discharge the same into the north fork of the Cache la Poudre River and into Sheep Creek, a tributary of the Cache la Poudre River and thence down the

Cache La Poudre River and its tributaries as hereinafter described, to be again diverted from the Cache la Poudre River and its tributaries for direct irrigation of lands and for storage for the subsequent irrigation of lands situate in Larimer and Weld Counties and in the State of Colorado. The ditches and appliances by means of which such appropriation of water shall be made and its diversion affected for the use intended are hereinafter more particularly mentioned and described.

(b) For the purpose of taking, diverting, carrying, storing, distributing, and making legal appropriation of water for storage of water for irrigation of any and all unappropriated waters available for storage flowing and to flow in the Cache la Poudre River and its tributaries and derived either from natural, flow, flood, or seepage water, or from the underflow of said river by means of the canals, reservoirs, waterworks and appliances, hereinafter mentioned and described, said water to be diverted for storage and stored as aforesaid, for subsequent use in irrigation in reservoirs at all times and seasons of the year when water can lawfully be obtained from the said Cache la Poudre river, and its tributaries in any manner whatsoever.

(c) For the purpose of purchasing, acquiring, constructing, owning operating, maintaining and carrying on storage reservoirs, as hereinafter mentioned and described, and otherwise to carry out the purposes above named; also to construct, acquire, purchase, own, operate, and maintain the proper and necessary ditches and laterals for the carriage and distribution of water from said stream together with outlet and discharge ditches and laterals and the necessary appurtenances and appliances connected therewith so as to utilize and devote to beneficial uses all the water to be stored as aforesaid.

(d) For the purpose of acquiring lands, rights of way for its reservoirs, inlet, outlet, supply and discharge ditches and laterals and sites for its reservoirs from the public domain, state lands, and private owners, by grant, purchase, condemnation, compliance with the

acts of congress providing for the granting of rights of way for ditches and reservoir sites and otherwise.

(e) Also for the purpose of using said waters and the application of the same to lands owned by said company and the individual members thereof and for selling and disposing of rights to the use of water for irrigation and other beneficial uses to such other persons and corporations as may acquire the use of the same upon such prices and upon such terms and conditions as may be hereafter determined by the board of directors of our said company and as its by-laws duly enacted shall prescribe.

(f) Also exercise of the powers necessary for the development and successful operation of said enterprise with the power to borrow money and sell, mortgage, or pledge its property and franchises and any and every part thereof; to secure such loans and procure funds for the corporate purposes of our said company and generally to do and to perform all things necessary and proper to be done under and by virtue of its corporate powers and to carry out the business and purposes hereinafter set forth.

III.

The natural stream from which water is to be taken and appropriated and to be taken to supply the ditches and reservoirs of our said Company, are the Laramie River and its tributaries and the Cache la Poudre River and its tributaries all in the County of Larimer and State of Colorado. Said waters are to be taken and diverted by means of ditches and canals as follows:

THE COLUMBINE DITCH, commencing at a point on a branch of Deadman Creek about five hundred feet west of the center of Sec. 35, Tp. 10, N. R. 75 W. Thence in a northeasterly direction, crossing another branch of said Creek and taking the water therefrom, to a point about 200 feet east of the S. 1/4 corner of sec. 26, said Tp. and range. Thence in a northeasterly direction to a branch of the North Fork of the Cache la

Poudre River, where water is to be discharged to be carried down said Cache la Poudre River and its branches to the place of diversion; said ditch will also be extended, from, at or near said S. 1/4 corner of said sec. 26 in a northerly direction through sections 26, 23, and 22 in said township and range, to head of Deadman Ditch on main branch of Deadman Creek at a point 750 feet north of the S.E. corner of section 15, township 10, N. Range 75 west, which ditch intersects and is to divert water from, several branches of said Deadman Creek, and runs thence from the point last mentioned in a northeasterly direction through sections 15, 16 and 9, in said Tp. and Range and described as follows: From station 0 the point last mentioned said ditch line runs as follows:

Thence S. 65° West 1000 feet; thence N. 81° west 850 feet; thence S. 73° west 890 feet; thence N. 28° east 760 feet; thence N. 16° 30' west 900 feet; thence N. 72° west 1280 feet; thence N. 56° 30' west 1150 feet; thence N. 50° west 1200 feet; thence N. 35° west 1350 feet; thence N. 30° east 565 feet; thence N. 5° east 700 feet; thence N. 75° 30' west 1000 feet; thence N. 69° 30' west 900 feet to a point where Sand Creek shows a well defined channel. Thence following said Sand Creek through sections 9 and 4, Tp. 10 N. R. 75, W. and through sections 33, 34, 27 and 22, Tp. 11 N. R. 75 W. where the Divide Ditch, socalled, is taken from said Sand Creek, to divert the waters therefrom derived as aforesaid. Said DivideDitch commencing at Station 5 at a point 240 feet S. 22° 30' west of the 1/4 corner on the E. side of sec. 22, from which point we run: S. 87° E. 391 feet; N. 45° E. 1100 feet N. 74° 30' E. 390 feet; S. 84° E. 600 feet; N. 58° E. 650 feet to point of discharge into Sheep Creek, which is a tributary of the north fork of the Cache la Poudre river.

From Station 5 we run: S. 54° 30' W. 640 feet; S. 60°30' W. 360 feet; S. 9° 30' W. 1000 feet; S. 78° 30' W. 210 feet; S. 49° W. 300 feet; S. 5° W. 300 feet and interscets and discharges into Sheep Creek,

so-called, a tributary of the Cache la Poudre River through which said waters, diverted as aforesaid, are to be carried into the Cache la Poudre River and carried, thence, to the proposed place of diversion from the Cache la Poudre River; to be used for the filling of reservoirs and for the direct irrigation of lands.

That to conserve and facilitate the collection and distribution of the waters derived from the tributaries of the Laramie River as aforesaid, several storage reservoirs are to be constructed along Sand Creek aforesaid, in sections 9 and 4, Tp. 10 N. R. 75 W., and in section 33, and 4, in Tp. 11, N. R. 75 W. and at other places.

That all of said waters derived and appropriated from the tributaries of the Laramie River and from the Cache la Poudre River and its tributaries are to be diverted from said river at the head of and carried through the ditch of the North Poudre Irrigation Co. and the ditch of the Poudre Valley Irrigation Company, respectively.

The ditch of the North Poudre Irrigation Company is an irrigating canal taken from the Cache la Poudre river, a sworn statement of which describing said ditch and the line thereof as heretofore constructed, has been duly filed in the office of the county clerk and recorder of the county of Larimer and state of Colorado, reference to which is, here made; the canal of The Poudre Valley Irrigation Company is an irrigating canal taken from the Cache la Poudre river, a sworn statement of which describing said ditch andthe line thereof as heretofore constructed, has been duly filed in the office of the county clerk and recorder of the county of Larimer and state of Colorado, reference to which is hereby made; also the Larimer county ditch, so-called, an irrigating canal taking water from the Cahhe la Poudre river, a sworn statement of which describing said ditch and the line thereof as heretofore constructed has been duly filed in the office of the county clerk and recorder of the county of Larimer and state of Colorado. That from said ditches the waters are to be carried by means of laterals, supply or connecting ditches to be hereafter constructed connecting said ditches with the reservoirs of the said company hereinafter described.

IV.

The principal reservoirs, other than above mentioned, to be constructed and operated as aforesaid by our said company, are reservoirs known as Reservoir No. 8 and Annex, and are situated in the county of Larimer and state of Colorado, being located upon parts of sections 13 and 24, in township 8, north, range 69 west, and upon sections 18 and 19, in township 8 north, range 68 west as shown by maps and statement filed in the office of the county clerk and recorder of Larimer county, Colorado, reference to which is here made, and maps filed in the United States Land Office under the provision of the acts of congress of March 3, 1891, providing for granting rights of way for ditch and reservoir sites. That the outlet from said Reservoir No. 8 and Annex is at a point whence the south quarter corner of said section eighteen bears south 55° 50' west, a distance of 658 feet and runs thence in a south-easterly direction and discharges into the Larimer County Canal and also may be carried across the Larimer County Canal and discharged into Elder Lake from which ditch and lake the water is to be carried by means of other laterals and appliances to place or places of use.

V.

The amount of capital stock of our said company shall be $200,000, divided into 2,000 shares of the par value of $100 for each share, and such stock when fully paid shall be non-assessable except for the purposes of the maintainance, operation and repairs of the canal and the ditches connected therewith.

VI.

The term of existence of the said company shall be twenty years with power thereafter to extend the term and existence in form and manner as provided by the laws of the state of Colorado.

VII.

The affairs and management of our said company shall be controlled by a board of directors consisting of three persons. The names of the directors who shall manage the affairs of said company for the first year of its existence and until the first Monday in February, 1905, and until their successors are duly elected and qualified are Benjamin H. Eaton, Bruce G. Eaton and Ellis Smith.

VIII.

The principal office and place of business of said company shall be at Eaton, county of Weld and state of Colorado, and the operations of said company shall be carried on in the county of Larimer and state of Colorado, where the said reservoirs and ditches are located

IX.

The board of directors of said company shall have power to make such prudential by-laws as they may deem proper for the management of the affairs of said company not inconsistent with the laws of the state of Colorado.

IN WITNESS WHEREOF, we have hereunto set our hands and seals this eleventh day of January, 1904.

Ellis Smith (Seal)

Bruce G Eaton (Seal)

Benjamin H Eaton (Seal)

by Bruce G Eaton Atty in Fact

1453

STATE OF COLORADO,)
:SS.
COUNTY OF WELD.)

I, Frederick L. Weller a notary public in and for the county of Weld and the state of Colorado, do hereby certify: That Benjamin H. Eaton by Bruce B. Eaton, his attorney in fact, Bruce G. Eaton, and Ellis Smith, who are personally known to me to be the persons whose names are subscribed to the annexed and foregoing certificate of incorporation, appeared before me this day in person, and acknowledged that they signed, sealed and delivered said instrument of writing in triplicate as their free and voluntary act for the uses and purposes therein set forth.

GIVEN under my hand and official seal this 10th day of January, 1904.

My commission expires _____

My Commission expires February 19th 1906.

Frederick L Weller

Notary Public, Weld County, Colo.

1455

38175

Articles of Incorporation

of The Divide Canal And

Reservoir Company.

DOMESTIC.

FILED in the office of the Secretary of State of the State of Colorado, on the 16 day of February A D 1904 at 9 30 o'clock A M.

Recorded 104 Page 188

James Cowie
Secretary of State.

Timothy J. Connor

50 00

James W. McCreery,
Attorney-at-Law,
Greeley, - - Colorado.

2981

CERTIFICATE OF AMENDMENT OF THE ARTICLES OF INCORPORATION

OF THE DIVIDE CANAL AND RESERVOIR COMPANY.

Office of The Divide Canal and Reservoir Company,
Eaton, Colorado, February 2, 1909.

At the annual meeting of the stockholders of The Divide Canal and Reservoir Company, duly called and assembled at the office of the Company on the 2nd. day of February, 1909, the following proceedings, inter alia, were had and entered of record, to-wit:

"Stockholder C. M. Strickland presented the following resolution, and moved its adoption, which was duly seconded by stockholder, Thos. Halpin:

'Be it resolved, that paragraph seven of the Articles of Incorporation of The Divide Canal and Reservoir Company be amended so as to read as follows:

'The affairs and management of our said Company shall be controlled by a board of directors consisting of five persons."

The said resolution was submitted to a vote of the stockholders, as provided by law, and the vote being duly canvassed, the chairman announced that the said resolution amending the articles of incorporation of our said Company had been duly carried, the vote in favor of said resolution being 2000 shares, being the total number of shares of stock authorized and outstanding, the

same was duly carried in form and manner as provided by law.

Bruce G Eaton
Chairman of Stockholders' Meeting of
The Divide Canal and Reservoir Company.

Attest: Clarence W Candlin
Secretary.

State of Colorado,)
) SS.
County of Weld.)

Bruce G. Eaton, president of The Divide Canal and Reservoir Company, and Clarence W. Candlin, secretary of The Divide Canal and Reservoir Company, do hereby certify that the above and foregoing is a true copy of the minutes of the annual meeting of The Divide Canal and Reservoir Company, duly called and held on the 2nd day of February, 1909, for the purpose, inter alia, of submitting to said Stockholders' Meeting the question of an amendment to the Articles of Incorporation of our said Company. The said proceedings were had and are now of record, amending the articles of incorporation of our said Company whereby the affairs and management of our said Company shall be controlled by a board of directors consisting of five persons. That this was adopted by a vote of more than two-thirds of the stock of said Company outstanding. That the undersigned as president and secretary of said Company were authorized to certify the same as provided by law.

In Witness whereof, we have hereto caused the corporate seal of our said Company to be affixed, and have subscribed our names hereto as president and secretary of The Divide Canal and Reservoir Company, this 2nd. day of February, A. D. 1909.

THE DIVIDE CANAL AND RESERVOIR COMPANY.

by Bruce G Eaton
President.

Attest: Clarence W. Candlin
Secretary.

The foregoing was subscribed and sworn to before me by Bruce G. Eaton, President, and Clarence W. Candlin, Secretary of said Company, this 21st day of April A. D. 1909.

My Commission expires My Commission Expires January 5, 1913.

NOTARY PUBLIC.

49337 ✓

Original

CERTIFICATE OF AMENDMENT OF THE ARTICLES OF INCORPORATION OF THE DIVIDE CANAL AND RESERVOIR COMPANY.

DOMESTIC

Recorded by
Date 4/30/09
Compared by

2985

CERTIFICATE OF EXTENSION OF CORPORATE LIFE

OF

THE DIVIDE CANAL AND RESERVOIR COMPANY.

KNOW ALL MEN BY THESE PRESENTS: That we, the undersigned, President and Secretary. respectively, of The Divide Canal and Reservoir Company, a corporation, duly organized and doing business under and by virtue of the laws of the State of Colorado, do, pursuant to said laws, make and execute, in quadruplicate, this certificate of extension of term and renewal of life of said corporation, as follows:

I.

That on the 24th day of November, 1923, persons owning more than ten per cent of the capital stock of The Divide Canal and Reservoir Company, a corporation , organized on the 11th day of January, 1904, and whose term of existence will expire twenty years from said date, give notice as by law provided, that a special meeting of the stockholders of the Divide Canal and Reservoir Company will be held in the office of said company in Eaton, Colorado, on the 5th day of January, 1924, for the purpose of considering and voting upon the question of extending the corporate life and term of existence for a period of twenty years from the date of expiration thereof, which notice was duly mailed to each and every stockholder of said company more than thirty days prior to the date of said meeting and was also published in the Eaton Herald, a weekly newspaper published in said Town of Eaton where the principal office of said company is located, for five successive weeks as by law provided.

II.

That upon the day mentioned for said meeting, and at the time and place mentioned in said notice, all the stockholders of said corporation convened and said special meeting of the stockholders was held for said purpose. That said meeting was duly organized

2986

and an inspection showed that all of the stock of said company, to-wit: 2000 shares, was present in person or duly represented by proxy; that at said meeting the following resolution was unanimously adopted, the vote thereon being taken by ballot and all the shares of the company being cast in favor thereof, viz:

RESOLUTION:

WHEREAS, The Divide Canal and Reservoir Company, a corporation was organized under the laws of the State of Colorado and became a corporation on the ~~11th day of February~~, 1904, and has ever since been and now is a corporation, actively engaged in the business for which it was incorporated, and said company has never been dissolved, and

Whereas, the term of existence or life of said company will expire on the ~~11th day of January~~, 1924 unless the same is extended as by law provided.

NOW THEREFORE, Be it Resolved, that the corporate life and term of existence of The Divide Canal and Reservoir Company be renewed and the same be extended for another term of twenty years from the date when said original term will expire, and to and including the ~~11th~~ 14th day of ~~January~~ February 1944, and that the President and Secretary of the company be and they are hereby empowered to make and execute under the seal of said corporation, a certificate showing that the life of said corporation has been extended for another period of twenty years from the expiration thereof.

That thereupon the corporate life of said company was extended until the ~~11th day of January~~ 14th day of February, A.D. 1944, and this certificate of said action is duly made, executed and filed in evidence thereof as by law proveded.

IN WITNESS WHEREOF, We have hereunto subscribed our names as such officers of said company, and have caused the corporate seal of said company to be hereunto affixed this 5th day of January, A.D. 1924.

Orrie Eaton President.

ATTEST:

Roy C. Eaton Secretary.

78774

CERTIFICATE OF RENEWAL OF CORPORATE LIFE OF THE DIVIDE CANAL AND RESERVOIR COMPANY.

6-26-29

This document has been inspected and properly Entered on the Records of The Flat Tax Department.

Date Jan 14 1924
Etma Darby Liddy Clerk
OK
Etma

DOMESTIC

FILED In the office of the Secretary of State, of the State of Colorado, on the 11 day of January A. D. 1924 at 2:10 o'clock P M
CARL S. McLIKEN, Secretary of State.
By [illegible] Deputy
Filing Clerk Leahy Fees 50 00

RECORDED

BOOK 238 PAGE 285

2988

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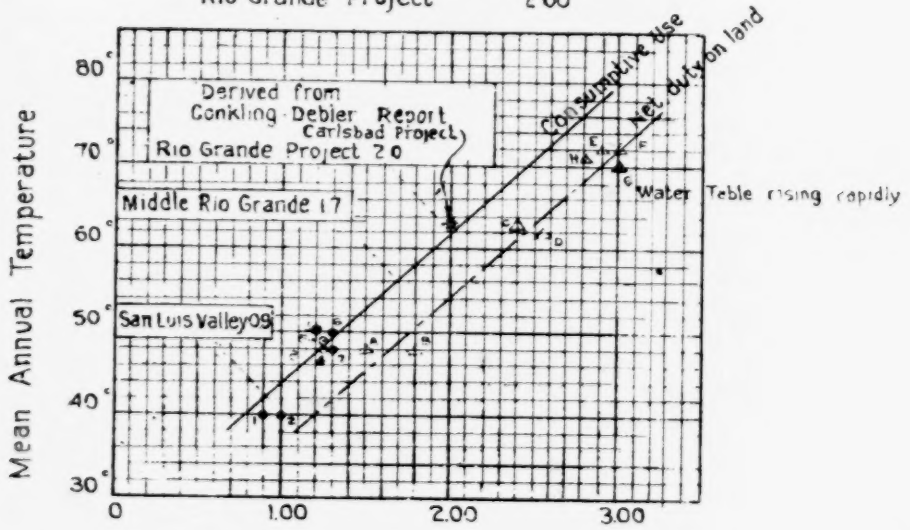
FOLD-OUT IS TOO LARGE TO BE FILM

GRAPH TO DETERMINE
CONSUMPTIVE USE OF IRRIGATION WATER

Assumes Drainage – Natural or Artificial
R.I. Meeker – Irrigation Engr.
March 25 - 1924

Values for Rio Grande Basin

from graph	Consumptive use A. ft per A per year
San Luis Valley	0.90
Middle Rio Grande Valley	1.70
Rio Grande Project	2.00



Consumptive Use of Water
Acre feet per Acre per year

○ CONSUMPTIVE USE DETERMINATIONS

1 Little Laramie R 12 year analysis
2 " " 3 " "
3 Boise Project Mason Cr Area
4 Cache la Poudre 2 year investigation
5 South Platte Basin 10 year analysis
6 Boise Project 3 year investigation
7 Sevier River Area 8 year analysis
8 South Platte. Kersey to Julesburg 1 year

△ NET DUTY on LAND – ACTUAL PRACTICE

A Cache la Poudre Special 2 year Investigation
B South Platte " 1 "
C Carlsbad Project U.S.R.S. 9 year Mean
D Rio Grande " 4 " "
E Irrigation Requirements Cal. Lands Bulletin 6 p 27
F " " " " " 6 p 29
G Salt River Project U.S.R.S. 8 year mean
H Yuma " 4 " "

NOTE. Carlsbad Project Canal & Lateral Losses 53% (Morit3) 1912-18. Percolation losses from Irrigated Land should be heavy. 0.40 A ft per A per year used in Conkling-Debler Report

Similar results to this curve secured by plotting above data against number of days in Growing Season.

R I M

2990

DEFENDANT'S EXHIBIT R

DEFENDANT'S EXHIBIT S

THE LARAMIE-POUDRE IRRIGATION CO.

H. D. PARKER, Pres. G. F SMITH, Sec'y.

GREELEY, COLORADO

November 8, 1926.

Mr. R. A. Mosier,
Jelm, Wyo.

Dear Sir:

Just received yourinquiry of the 6th in regard to the amount of water run thru the tunnel. The running of water was not in my hands and will not vouch for the records that I have but am sending you the computation of the water from the records sent to me by Duvall.

There are some skips in these reports and I do not know whether the tunnel was shut down at those times or not. This record also includes any water run by the Water Supply & Storage Co and as yet I have no way of seggregating same from our water.

Duvall reports as follows:

March, 1926	3,542,400 cu. ft.
April	49,446,720
May	79,427,520
June	115,215,760
July	143,710,480
August	165,720,800
September	33,056,640
	590,120,320

(1926) - 590,120320
(1927) - 260,729,280
329 391, 40 Less than 1926.

If there is any particular importance to above, would suggest that you verify same from W. J. McAnelly as Duvall was supposed to make daily reports by phone to him.

Duvall's address is as follows:

J. H. Duvall
c/o Roy Fee
315 So. Loomis St
Fort Collins, Colo.

Duvall's reports start in on the 5th of September and run to the 23rd of September, it is my understanding that this is the time that the water for the Water Supply was running and we were to get an average of 13 feet and the balance was to go to the Water Supply. There are no reports for Sept. until the 5th of the month and I presume we were shut out. Duvall quit on the 23rd of Sept.

Sorry that I cannot do more for you and if there is any thing else that you want let me know.

Yours truly, G. F. Smith

2991

[fols. 2992 & 2993] DEFENDANT'S EXHIBIT T

The Greeley-Poudre Irrigation District, Inc.

Engineering Department

Laramie-Poudre Tunnel Rating Station

James H. Duvall, Observer

Time	Mo.	Day	Year	Gage height	Discharge	
Average	Mar.	24	1926	3.30	10.50	907,200
	Mar.	25	1926	3.15	10	864,000
	Mar.	26	1926	3.15	10	864,000
	Mar.	27	1926	3.30	10.50	907,200
						3,542,400

[fol. 2994]

Average	Mar.	28	1926	.315	10	3,542,400
	Mar.	29	1926	.315	10	6,091,600
	Mar.	30	1926	.315	10	9,633,600
	Mar.	31	1926	.315	10	
	April	1	1926	.315	10	
	April	2	1926	.315	10	
	April	3	1926	.330	10.5	

[fol. 2995]

Average	April	4	1926	.315	10	9,633,600
	April	5	1926	.315	10	6,177,600
	April	6	1926	.315	10	15,811,200
	April	7	1926	.315	10	
	April	8	1926	.330	10.5	
	April	9	1926	.330	10.5	
	April	10	1926	.330	10.5	

[fol. 2996]

Average	April	11	1926	.345	11	15,811,200
	April	12	1926	.345	11	7,322,400
	April	13	1926	.360	11.5	23,133,600
	April	14	1926	.360	11.5	
	April	15	1926	.375	12	
	April	16	1926	.4	13	
	April	17	1926	.450	14.75	

[fol. 2997]

Average	April	18	1926	.5	16.50	23,133,600
	April	19	1926	.450	14.75	10,294,560
	April	20	1926	.5	16.50	33,428,160
	April	21	1926	.545	18.50	
	April	22	1926	.5	16.50	
	April	23	1926	.593	20.60	
	April	24	1926	.482	15.80	

[fol. 2998]

Average	April	25	1926	.5	16.5	33,428,160
	April	26	1926	.57	19.6	16,018,560
	April	27	1926	.626	22.3	49,446,720
	April	28	1926	.697	25.8	
	April	29	1926	.78	30.8	
	April	30	1926	.838	34.5	
	May	1	1926	.86	35.9	

[fol. 2999]

DEFENDANT'S EXHIBIT T—Continued

Time	Mo.	Day	Year	Gage height	Discharge	
Average	May	2	1926	.896	38.3	31,199,040 total for this week
	May	3	1926	.965	43.7	
	May	4	1926	1.111	56.1	
	May	5	1926	1.2286	68	
	May	6	1926	1.215	66.5	
	May	7	1926	1.019	48.1	
	May	8	1926	.924	40.4	

[fol. 3000]

Average	May	9	1926	.782	30.9	31,199,040
	May	10	1926	.662	24.1	13,910,400
	May	11	1926	.722	27.3	
	May	12	1926	.684	25.2	45,109,440
	May	13	1926	.59	20.5	
	May	14	1926	.5	16.5	
	May	15	1926	.5	16.5	

[fol. 3001]

Average	May	16	1926	.550	18.7	14,817,600
	May	17	1926	.633	22.6	45,109,440
	May	18	1926	.660	24	
	May	19	1926	.608	21.4	59,927,040
	May	20	1926	.641	23	
	May	21	1926	.825	33.6	
	May	22	1926	.737	28.2	

[fol. 3002]

Average	May	23	1926	.699	25.9	59,927,040
	May	24	1926	.770	30.2	19,500,480
	May	25	1926	.714	26.8	
	May	26	1926	.671	24.5	79,427,520
	May	27	1926	1.173	62.3	
	May	28	1926	.750	29	
	May	29	1926	.717	27	

[fol. 3003]

Average	May	30	1926	.7	26	79,427,520
	May	31	1926	.7	26	12,804,480
	June	1	1926	.635	22.70	
	June	2	1926	.553	18.8	92,232,000
	June	3	1926	.553	18.8	
	June	4	1926	.516	17.2	
	June	5	1926	.55	18.70	

[fol. 3004]

Average	June	6	1926	.52	17.4	92,232,000
	June	7	1926	.50	16.5	9,529,200
	June	8	1926	.50	16.5	
	June	9	1926	.48	15.8	101,761,200
	June	10	1926	.45	14.7	
	June	11	1926	.45	14.7	
	June	12	1926	.45	14.7	

Tunnel being repaired for cave-in West Portal.

[fol. 3005]

Average	June	13	1926	.45	14.7	101,761,920
	June	14	1926	.44	14.4	6,844,240
	June	15	1926	.43	14.1	
	June	16	1926	.43	14.1	108,606,160
	June	17	1926	.4	13	
	June	18	1926	.28	8.8	

[fol. 3006]

DEFENDANT'S EXHIBIT T—Continued

Time	Mo.	Day	Year	Gage height	Discharge	
Average	June	23	1926	3.	9.5	108,606,160
	June	24	1926	.330	10.5	4,155,840
	June	25	1926	.442	14.4	
	June	26	1926	.420	13.7	112,762,000

[fol. 3007]

Average	June	27	1926	.43	14	112,762,000
	June	28	1926	.442	14.4	2,453,760
						115,215,760

[fol. 3008]

Average	July	4	1926	8	32	115,215,760
	July	5	1926	7	26	29,203,200
	July	6	1926	.698	25.9	
	July	7	1926	1.21	66	144,418,960
	July	8	1926	1.22	67.1	
	July	9	1926	1.17	62	
	July	10	1926	1.14	59	

[fol. 3009]

Average	July	11	1926	.644	23.2	115,215,760
	July	12	1926	.47	15.4	10,290,240
	July	13	1926	.46	15.1	
	July	14	1926	.495	16.3	125,506,000
	July	15	1926	.5	16.5	
	July	16	1926	.5	16.5	
	July	17	1926	.49	16.1	

[fol. 3010]

Average	July	18	1926	.490	16.1	125,506,000
	July	19	1926	.470	15.4	9,365,760
	July	20	1926	.465	15.2	
	July	21	1926	.490	15.8	134,871,760
	July	22	1926	.476	15.6	
	July	23	1926	.445	14.5	
	July	24	1926	.480	15.8	

[fol. 3011]

Average	July	25	1926	.465	15.2	134,871,760
	July	26	1926	.490	16.1	8,838,720
	July	27	1926	.430	14	
	July	28	1926	.430	14	143,710,480
	July	29	1926	.445	14.5	
	July	30	1926	.445	14.5	
	July	31	1926	.430	14	

[fol. 3012]

Average	Aug.	1	1926	.420	13.7
	Aug.	2	1926	.410	13.3
	Aug.	3	1926	.410	13.3
	Aug.	4	1926	.4	13
	Aug.	5	1926	.4	13
	Aug.	6	1926	.4	13
	Aug.	7	1926	.4	13

[fol. 3013]

Average	Aug.	8	1926	.42	13.7	151,685,200
	Aug.	9	1926	.43	14	7,853,760
	Aug.	10	1926	.41	13.3	
	Aug.	11	1926	.4	13	158,538,960

DEFENDANT'S EXHIBIT T—Continued

Time	Mo.	Day	Year	Gage height	Discharge	
Average	Aug.	12	1926	.38	12.3	
	Aug.	13	1926	.38	12.3	
	Aug.	14	1926	.38	12.3	
[fol. 3014]						
Average	Aug.	15	1926	.37	11.9	158,538,960
	Aug.	16	1926	.38	12.3	7,181,840
	Aug.	17	1926	.37	11.9	
	Aug.	18	1926	.37	11.9	165,720,800
	Aug.	19	1926	.37	11.9	
	Aug.	20	1926	.36	11.6	
	Aug.	21	1926	.36	11.6	
[fol. 3015]						
Average	Aug.	22	1926	.4	13	
	Aug.	23	1926	.46	15.1	
	Aug.	24	1926	.73	27.8	
	Aug.	25	1926	.73	27.8	
	Aug.	26	1926	.76	29.6	
	Aug.	27	1926	.74	28.4	
	Aug.	28	1926	.72	27.2	
[fol. 3016]						
Average	Aug.	29	1926	.72	27.2	
	Aug.	30	1926	.72	27.2	
	Aug.	31	1926	.71	26.6	
	Sept.	1	1926	.71	26.6	
	Sept.	2	1926	.71	26.6	
	Sept.	3	1926	.71	26.6	
	Sept.	4	1926	.73	27.8	
[fol. 3017]						
Average	Sept.	5	1926	.72	27.2	
	Sept.	6	1926	.68	25	
	Sept.	7	1926	.68	25	
	Sept.	8	1926	.74	28.4	
	Sept.	9	1926	.63	22.5	
	Sept.	10	1926	.61	21.5	
	Sept.	11	1926	.60	21	
[fol. 3018]						
Average	Sept.	5	1926	.72	27.2	
	Sept.	6	1926	.68	25	
	Sept.	7	1926	.68	25	
	Sept.	8	1926	.74	28.4	
	Sept.	9	1926	.63	22.5	
	Sept.	10	1926	.61	21.5	
	Sept.	11	1926	.60	21	
[fol. 3019]						
Average	Sept.	12	1926	.61	21.5	
	Sept.	13	1926	.60	21	
	Sept.	14	1926	.60	21	
	Sept.	15	1926	.60	21	
	Sept.	16	1926	.59	20.5	
	Sept.	17	1926	.57	19.6	
	Sept.	18	1926	.54	18.3	
[fol. 3020]						
Average	Sept.	19	1926	.52	17.4	33,056,640 for Sept.
	Sept.	20	1926	.52	17.4	
	Sept.	21	1926	.52	17.4	
	Sept.	22	1926	.51	16.9	

[fol. 3021]

DEFENDANT'S EXHIBIT U

The Water Supply and Storage Company

To the President of the Water Supply and Storage Company, Fort Collins, Colo.: Chambers Lake, Colorado, June 20, 1926.

DEAR SIR:

Herewith I hand you Report of Discharge of the several Ditches in Mountain Division upon dates as stated below:

Date	Name of ditch	Depth over weir	Discharge in cubic feet	Name of ditch	Depth over weir	Discharge in cubic feet	Name of ditch	Depth over weir	Discharge in cubic feet
June 17	Grand.....	....	....	Laramie.....	....	....	Cameron Pass.....	.48	5.55
18								.48	5.55
19	Turned out.			Turned out.				.42	4.53

Remarks: ——.

Archie E. Gifford, Superintendent of Mountain Division.

[fol. 3022]

DEFENDANT'S EXHIBIT V

The Water Supply and Storage Company

To the President of the Water Supply and Storage Company, Fort Collins, Colo.: Chambers Lake, Colorado, June 24, 1926.

DEAR SIR:

Herewith I hand you Report of Discharge of the several Ditches in Mountain Division upon dates as stated below:

Date	Name of ditch	Depth over weir	Discharge in cubic feet	Name of ditch	Depth over weir	Discharge in cubic feet	Name of ditch	Depth over feet	Discharge in cubic feet
June 20	Grand.....	....	....	Laramie.....	....	....	Cameron Pass.....	.42	4.53
21	Turned out.			Turned out.				.40	4.21
22								.36	3.59
23								.36	3.59

Remarks: ——.

Archie E. Gifford, Superintendent of Mountain Division.

[fol. 3023] DEFENDANT'S EXHIBIT W

Copied into the Record at p. 1292.

(Here follow photolithographs of Defendant's Exhibit X, side folios 3024 and 3024a)

DEFENDANT'S EXHIBIT X

No. 249

Seventy-five Thousand Cubic Feet.

PREFERRED WATER RIGHT

FROM

THE GILMORE RESERVOIR

THIS INDENTURE, Made and entered into this.....day of.....A. D. 19....., by and between **THE MOUNTAIN & PLAINS IRRIGATION COMPANY,** a Colorado corporation, hereinafter called "Grantor", and.....

of.....County, Colorado, hereinafter called the "Grantee", WITNESSETH:

WHEREAS, The Mountain & Plains Irrigation Company has, under authority of its stockholders and Board of Directors so to do, fixed and set apart thirty-seven million five hundred thousand cubic feet of water for irrigation purposes, to be derived from all sources of supply of water for irrigation purposes, of said company and stored in the Gilmore Reservoir of said company, said water to be divided into five hundred water rights of seventy-five thousand cubic feet of water each, and said company, having declared such water rights to the extent of 37,500,000 cubic feet to be a first and preferred charge and use in and upon the Bob Creek Ditch, The Columbine Ditch and the Gilmore Reservoir of said company, as now constructed and used, and

WHEREAS, Said company has authorized its president and secretary to sell such preferred water rights to a total amount of 37,500,000 cubic feet.

NOW, THEREFORE, Grantor, for itself, its successors and assigns, and in consideration of the sum of One Hundred Fifty and no/100 Dollars ($150.00) for each preferred right as hereinafter described, to it in hand paid, does hereby bargain, sell and grant to said grantee, his heirs and assigns forever, the following property, water rights, and hereditaments, that is to say: The right to.....(.....) preferred rights of 75,000 cubic feet each of water annually, to be stored in the Gilmore Reservoir of said company in Larimer County, Colorado, and delivered therefrom or from other sources of supply of said grantor; said amount of water shall be set apart and reserved for grantees under this and similar contracts, subject to the terms and conditions stated below and not otherwise, viz.:

CONDITION NO. I.

The place of delivery of water under this contract shall be at the present headgate of any intake ditch on the Cache la Poudre River, which ditch shall have and maintain a sufficient diversion dam, and headgate to divert such water from the said Cache la Poudre River.

CONDITION NO. II.

The place of measurement of said water shall be at the weir of any intake ditch on the Cache la Poudre River, receiving and carrying water for the grantee herein.

CONDITION NO. III.

The measurement of said water shall be made according to the methods then in effect and use by the office of the State Engineer of Colorado, and the Water Commissioner of the Water District in which the water herein sold shall be used.

CONDITION NO. IV.

The time of delivery of water each calendar year shall be between the 15th day of May and 10th day of September, as called for by the grantee, subject to the following provisions and conditions:

Condition No. 1: Grantee shall not be entitled to have water delivered to him at any time unless he alone, or in connection with other persons holding similar contracts, shall call for water in such amount and for such duration of time as shall be in conformity with the rules of the office of the State Engineer and Water Commissioner in control of the distribution of water from the said Cache la Poudre River.

Condition No. 2: For each delivery of water grantor must have at least twenty-four hours' notice in writing of the aggregate amount called for by all grantees uniting in such call, signed by such grantees, or their authorized agents, and designating the particular contracts on which said delivery is to be pro-rated, the delivery in cubic feet per second called for in the aggregate, the duration thereof; under these conditions grantee may call for water until in the aggregate the amount delivered to him equals the amount per annum hereby sold.

Condition No. 3: Grantee shall not be entitled to receive any water under this contract until he has paid to Grantor as maintenance charge for each and every year beginning with the date of this contract, the sum of Five Dollars ($5.00) for each preferred right of 75,000 cubic feet. Such maintenance charge shall be due and payable on the 1st day of March of each any every year. All delinquent maintenance charges shall draw interest at the rate of one per cent. per month from the date of delinquency to and until the same shall be paid

Condition No. 2: For each delivery of water grantor must have at least twenty-four hours' notice in writing of the aggregate amount called for by all grantees uniting in such call, signed by such grantees, or their authorized agents, and designating the particular contracts on which said delivery is to be pro-rated, the delivery in cubic feet per second called for in the aggregate, the duration thereof; under these conditions grantee may call for water until in the aggregate the amount delivered to him equals the amount per annum hereby sold.

Condition No. 3: Grantee shall not be entitled to receive any water under this contract until he has paid to Grantor as maintenance charge for each and every year beginning with the date of this contract, the sum of Five Dollars ($5.00) for each preferred right of 75,000 cubic feet. Such maintenance charge shall be due and payable on the 1st day of March of each any every year. All delinquent maintenance charges shall draw interest at the rate of one per cent. per month from the date of delinquency to and until the same shall be paid.

It is hereby agreed and understood between the grantor and the grantees herein, and the heirs and assigns of such grantee, that in case the grantor herein shall not desire to deliver to the grantee the water herein sold from the said Gilmore Reservoir of the grantor, then and in that case the grantor does hereby specially reserve the right to deliver the water herein sold to grantee from any or all sources of supply of said grantor.

It is understood that any assignee, claiming title under grantee herein, shall file in the office of the grantor's secretary, prior to receiving water hereunder, a properly executed assignment of this contract.

IN WITNESS WHEREOF, The Mountain & Plains Irrigation Company has caused its corporate name to be hereunto subscribed by its President, attested by its Secretary, and its corporate seal to be hereunto affixed this_____ day of_____, 19____.

THE MOUNTAIN & PLAINS IRRIGATION COMPANY

ATTEST:

By_____
President.

_____Secretary.

STATE OF COLORADO, }
COUNTY OF LARIMER, } ss.

I,_____, a Notary Public in and for said County, in the State aforesaid, do hereby certify that _____, who is personally known to me to be the same person who subscribed the foregoing indenture as president of **The Mountain & Plains Irrigation Company** and on behalf of said company, as its act and deed, appeared before me this day in person and acknowledged that he signed, sealed and delivered the said instrument of writing with authority of its Board of Directors, for and on behalf of said corporation, and that the same is the free and voluntary act and deed of the said **The Mountain & Plains Irrigation Company,** by him subscribed and executed as president thereof; and further that the corporate seal thereto affixed is the corporate seal of said company, and duly attested by its secretary with authority.

Given under my hand and notarial seal this_____ day of_____, 19____.

My commission expires_____

_____Notary Public.

3024

ASSIGNMENT

OF WATER RIGHT ATTACHED TO AND MADE A PART OF CONTRACT NO.....(.....) OF THE MOUNTAIN & PLAINS IRRIGATION COMPANY WITH.....FOR.....(.....) PREFERRED WATER RIGHTS FROM THE GILMORE RESERVOIR,

.....of.....County, the last named grantee of the water rights, privileges and property conveyed by the annexed contract, No.....(.....), for and in consideration of the sum of ..... ($.....) to.....in hand paid, do hereby bargain, sell, grant and convey to.....of..... forever, all right, title and interest and claim in and to said water right, privilege and property in said contract described and conveyed, which contract is recorded in Book....., Page..... of the records of the office of the County Clerk and Recorder of Larimer County, Colorado, SUBJECT, HOWEVER, TO ALL OF THE CONDITIONS OF THE SAID CONTRACT.

WITNESS My hand and seal at.....this.....day of....., 19.....

.....(SEAL)

STATE OF COLORADO, }
County of Larimer, } ss.

Before me,....., a Notary Public in and for said County and State this day personally came.....known to me to be the indentical person who executed the foregoing assignment, and acknowledged that he signed, sealed and delivered the same as his free and voluntary act and deed for the purposes therein set forth.

Given under my hand and notarial seal this .....day of....., 19.....

My commission expires.....

.....
Notary Public

ASSIGNMENT

OF WATER RIGHT ATTACHED TO AND MADE A PART OF CONTRACT NO.....(.....) OF THE MOUNTAIN AND PLAINS IRRIGATION COMPANY WITH.....FOR.....(.....) PREFERRED WATER RIGHTS FROM THE GILMORE RESERVOIR,.....of....., the last named grantee of the water right, privilege and property conveyed by the annexed contract, No.....for and in consideration of the sum of $.....to..... in hand paid, do hereby bargain, sell, grant and convey to.....of..... forever, all right, title and interest and claim in and to said water right, privilege and property in said contract described and conveyed, which contract is recorded in Book....., Page.....of the records of the office of the County Clerk and Recorder of Larimer County, Colorado, SUBJECT, HOWEVER, TO ALL OF THE CONDITIONS OF THE SAID CONTRACT.

WITNESS My hand and seal at.....this.....day of.....,19.....

.....(SEAL)

STATE OF COLORADO, }
County of Larimer, } ss.

Before me,....., a Notary Public in and for said County and State this day personally came.....known to me to be the indentical person who executed the foregoing assignment, and acknowledged that he signed, sealed and delivered the same as his free and voluntary act and deed for the purposes therein set forth.

Given under my hand and notarial seal this .....day of....., 19.....

My commission expires.....

.....
Notary Public.

Serial No. 249

Serial No. 249

Original No.

PREFERRED WATER RIGHT

FROM

THE GILMORE RESERVOIR

The Mountain & Plains Irrigation Company

TO

3024-A

THE C. F. HOECKEL CO., DENVER 97189

[fol. 3025] DEFENDANT'S EXHIBIT Y

No. 218103

Quit Claim Deed

This Deed, made this 4th day of October, in the year of our Lord one thousand nine hundred and nineteen, between The Divide Canal & Reservoir Company, a corporation duly organized and existing under and by virtue of the laws of the State of Colorado, and Bruce G. Eaton, as executor of the will of Benjamin H. Eaton, deceased, of the first part, and Roy A. Portner, of the County of Larimer and State of Colorado, of the second part:

Witnesseth, that the said parties of the first part, for and in consideration of the sum of One Dollar, to the said parties of the first part in hand paid by the party of the second part, the receipt whereof is hereby confessed and acknowledged, have remised, released, sold, conveyed, and Quit Claimed, and by these presents do remise, release, sell, convey and Quit Claim unto the said party of the second part, his heirs and assigns forever, all the right, title, interest, claim and demand which the said parties of the first part have in and to the following described ditch right of way and water rights, situate, lying and being in the County of Larimer, and State of Colorado, to-wit:

The Columbine Ditch, commencing at a point on Columbine Creek, a branch of Deadman Creek, about five hundred (500) feet west of the center of section thirty-five (35) township ten (10) North, range seventy-five (75) west of the 6th P. M.; thence in a northeasterly direction crossing another branch of said creek and other water courses and taking the water therefrom to a point about two hundred (200) feet east of the south quarter corner of Section twenty-six (26) of said township and range; thence in a northeasterly direction to a branch of the north fork of The Cache la Poudre River, where water is to be discharged to be carried down said Cache la Poudre River and its branches to the place or places of diversion; together with all appropriations, filings, rights of way, and water rights vested in connection with said Columbine Ditch, and the water diverted and which may be diverted and used by means of said Columbine Ditch from Columbine Creek,

and from the streams intercepted by means of said ditch, it being the intention hereby to convey every right held by the grantors in and to that certain ditch and project initiated by Phillip Wilson and Rollin Q. Tenney, the work whereon was commenced on the 7th day of September, 1897, as shown by Statement of claim filed by said Wilson and Tenney in the office of the County Clerk and Recorder of Larimer County, but as said Columbine Ditch is not and has not been connected with The Sand Creek Ditch System, the rights above conveyed shall not include any part of Priority Number Thirty-eight (38) for two hundred eighty-eight (288) cubic feet decreed to The Sand Creek Ditch System by The District Court of Larimer County in Case No. 1885 made and entered October 11th, 1906, on account [fol. 3026] of any statement therein contained as to The Columbine Ditch, with respect to any diversions or appropriations made or claimed by the party of the first part out of Sand Creek and Deadman Creek, and said decreed appro-riation of 288 cubic feet per second of said system shall continue to be owned, used and enjoyed as to Sand Creek and Deadman Creek to the full extent of 288 cubic feet per second by The Divide Canal & Reservoir Company, its successors and assigns.

To have and to hold the same, together with all and singular the appurtenances and privileges thereunto belonging, or in anywise thereunto appertaining, and all the estate, right, title, interest and claim whatsoever, of the said parties of the first part, either in law or equity, to the only proper use, benefit and behoof of the said party of the second part, his heirs and assigns forever.

In witness whereof the said The Divide Canal & Reservoir Company hath caused its corporate name to be hereunto subscribed by its * * * President, and its corporate seal to be hereunto affixed, attested by its Secretary, and the said Bruce G. Eaton, as Executor aforesaid, has hereunto subscribed his hand and seal the day and year first above written.

The Divide Canal & Reservoir Company, by Bruce G. Eaton, President. Attest: Rex C. Eaton, Secretary. (Seal.) Bruce G. Eaton, Executor of the Will of Benjamin H. Eaton, Deceased.

U. S. Revenue Stamps attached. $3.50. 8-10-19. B. G. E.

STATE OF COLORADO,
County of Weld, ss:

I, William P. Cudmore, a Notary Public in and for said Weld County, in the state aforesaid, do hereby certify that Bruce G. Eaton and Rex C. Eaton, who are personally known to me to be the same persons whose names are subscribed to the foregoing deed as having executed the same respectively as President and Secretary of The Divide Canal & Reservoir Co., a corporation, and who are known to me to be such officers, respectively, appeared before me this day in person, and severally acknow-edged: That the [fol. 3027] seal affixed to the foregoing instrument is the corporate seal of said corporation; that the same was thereunto affixed by the authority of said corporation; that said instrument was by like authority subscribed with its corporate name; that the said Bruce G. Eaton is the • • • President of said corporation, and the said Rex C. Eaton is the Secretary thereof; that by the authority of said corporation they respectively subscribed their names thereto as President and secretary, and that they signed, sealed, and delivered the said instrument of writing as their free and voluntary act and deed of said corporation for the uses and purposes therein set forth.

Given under my hand and notarial seal, this 4th day of October, 1919.

William P. Cudmore, Notary Public. (Seal.)

My commission expires Nov. 1, 1922.

STATE OF COLORADO,
County of Weld, ss:

I, William P. Cudmore, a Notary Public in and for the said Weld County, in the State aforesaid, do hereby certify that Bruce G. Eaton, Executor of the Will of Benjamin H. Eaton, deceased, who is personally known to me to be the person whose name is subscribed to the foregoing Deed, appeared before me this day in person and acknowledged that he signed, sealed and delivered the said instrument of writing as his free and voluntary act and deed, for the uses and purposes therein set forth.

Giver under my hand and notarial seal, this 4th day of October, 1919.

William P. Cudmore, Notary Public, (Seal.)

My commission expires Nov. 1, 1922.

Filed for record at 11:15 o'clock A. M. January 4, 1921, and duly recorded in Book 420 at page 364.

G. R. Cushing, County Recorder; J. L. Peasley, Deputy Recorder.

[fol. 3028] (Certified Copy)

STATE OF COLORADO,
County of Larimer, ss:

I, Hervey D. Hubbell, County Clerk and Recorder in and for said County and State, do hereby certify that the within and foregoing is a full, true and correct copy of Quit Claim Deed—The Divide Canal & Reservoir Company et al. to Roy A. Portner, No. 218103, as it appears of record in my office in Book 420 at page 364.

Witness my hand and official seal at Fort Collins, Colorado, this 6th day of June, 1933.

Hervey D. Hubbell, County Clerk and Recorder, Larimer County, Colorado, by —— ——, Deputy.

Issued to Wm. A. Bryans.
No. 2709.
Fee, 1.00.

[fol. 3029] [Endorsed:] Copy. No. 218103. Quit Claim Deed. The Divide Canal & Reservoir Co. and Estate of Benjamin H. Eaton to Roy A. Portner.

STATE OF COLORADO,
County of Larimer, ss:

I hereby certify that this instrument was filed for record in my office at 11:15 o'clock A. M., on January 4, 1921, and is duly recorded in Book 420 at page 364 of the records of Larimer County, Colorado.

G. R. Cushing, County Recorder; J. L. Peasley, Deputy Recorder.

[fol. 3030] DEFENDANT'S EXHIBIT Z

Statement of the Bob Creek Extension Ditch

No. 493

Statement of Claim to Water Right

Irrigation Division No. 1, Water District No. 48

STATE OF COLORADO,
County of Larimer, ss:

Philip Wilson and A. L. Clark, the owner- of the following described ditch, in compliance with the requirements of the provisions of General Section No. 1720 of the General Statutes of the State of Colorado, approved April 20th, 1887, and the acts amendatory thereto, do hereby make this statement for filing:

1. The names of the owners of said ditch are Philip Wilson and A. L. Clark, whose Postoffice address is for each, Fort Collins, Larimer County, Colorado.

2. The name of said ditch is The Bob Creek Extension Ditch.

3. The headgate of said ditch is situated at a point whence the south quarter corner of Section 4, in T. 9 N. of R. 75 W., bears south 27° west, 1475 feet. From the headgate the ditch runs in a general northeasterly direction, as shown on the plat hereto attached and made a part of this statement.

4. The length of said ditch is 8020 feet.

5. The width of said ditch on the bottom is 10 feet.

6. The width at the high water line is 12 feet.

7. The depth of water carried in said ditch is 3 feet.

8. The grade of said ditch is 5 feet per mile.

9. The carrying capacity of said ditch is 50 cubic feet of water per second of time.

10. Work was commenced on said ditch on the 17" day of September, A. D. 1898.

11. The size of said ditch, as enlarged by this enlargement is —— feet in width on the bottom, —— feet in width at high water mark, and —— feet in depth.

12. The increased capacity arising from such enlargement is —— cubic feet of water per second of time.

13. The work on said enlargement was commenced on the — day of ——, A. D. 18—.

Witness our hands and seals this eleventh day of October, A. D. 1898.

Philip Wilson, (Seal.) A. L. Clark, (Seal.)

U. S. Revenue Stamps attached. P. W. 10/11/98. 10¢.

[fol. 3031] STATE OF COLORADO,
County of Larimer, ss:

Rollin Q. Tenney being first duly sworn, on oath says that he has read the above and foregoing statement and examined the plat thereto attached, and that the matters therein set forth are true of his own knowledge.

Rollin Q. Tenney.

Subscribed and sworn to before me this eleventh day of October, A. D. 1898.

Charles F. Davis, Notary Public. (Seal.)

My com. expires Aug. 18, 1900.

U. S. Revenue Stamps attached. C. F. D. 10/11/98. 10¢.

Filed for record at 11:30 o'clock A. M. Oct. 17, 1898.
H. E. Tedmon, Recorder, by J. E. Ramer, Deputy.

(Here follows photolithograph of map, side folio 3032)

DEFENDANT'S EXHI

BOB CREEK
EXTENSION DITCH.
All Government Land.

Scale 1" = 600 ft.

Va 15° E.

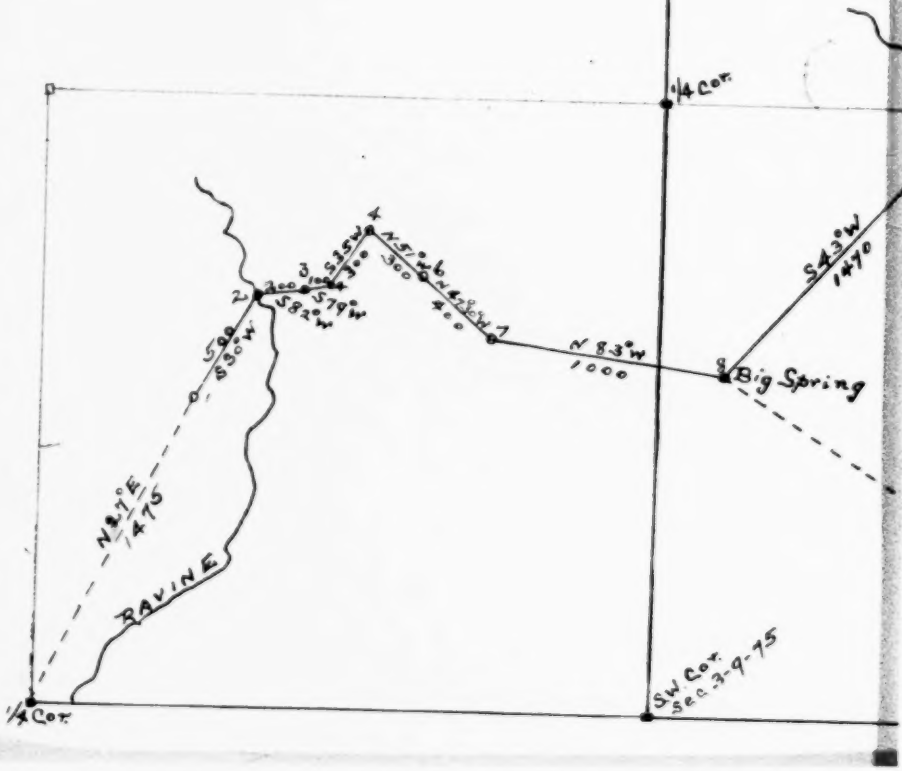
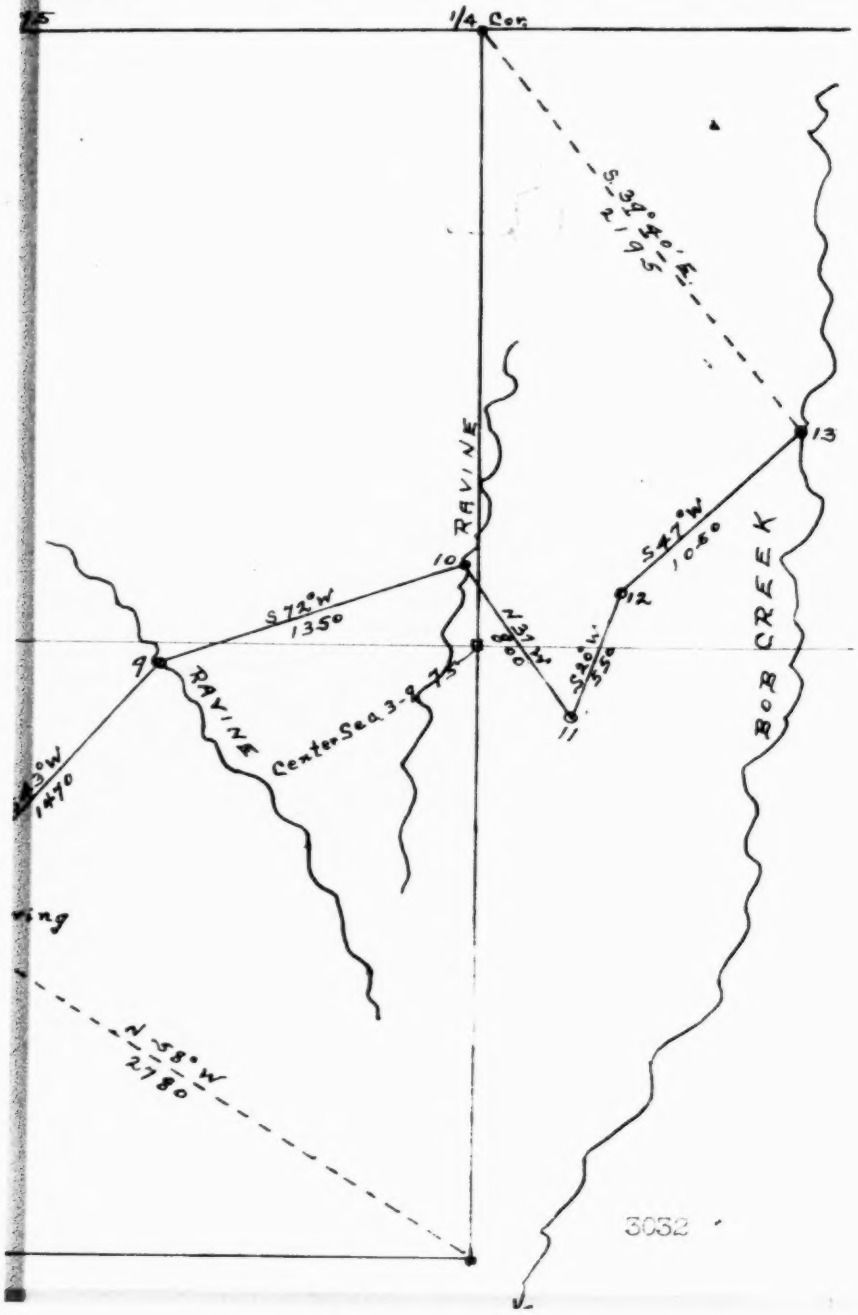


EXHIBIT Z


1/4 Cor.
S 39°40' E.
2195
13
S 47°W
1050
12
BOB CREEK
RAVINE
10
S 72°W
1350
9
RAVINE
N 37°W
800
S 20°W
550
11
Center Sea 3-9-75
1470
N 58°W
2780

[fol. 3033] (Certified Copy)

STATE OF COLORADO,
County of Larimer, ss:

I, Hervey D. Hubbell, County Clerk and Recorder in and for said County and State, do hereby certify that the within and foregoing is a full, true and correct copy of statement of the Bob Creek Extension Ditch, No. 493, as it appears on file in my office in Book — at page —, File 493 of Ditches and Reservoirs.

Witness my hand and official seal at Fort Collins, Colorado, this 6th day of June, 1933.

Hervey D. Hubbell, County Clerk and Recorder, Larimer County, Colorado, by —— ——, Deputy.

Issued to Wm .A. Bryans.
No. 2707.
Fee, 2.00.

[fol. 3034] [Endorsed:] Copy. 493. Statement of the Bob Creek Extension Ditch. Philip Wilson, A. L. Clark, Owners.

STATE OF COLORADO,
County of Larimer, ss:

I hereby certify that this instrument was filed in my office at 11:30 o'clock A. M., Oct. 17, 1898.

H. E. Tedmon, Recorder, by J. E. Ramer, Deputy.

[fol. 3035] DEFENDANT'S EXHIBIT A-1

Statement of the Bob Creek Ditch

No. 473

Statement of Claim to Water Right

Irrigation Division No. 1, Water District No. 48

STATE OF COLORADO,
County of Larimer, ss:

I, Philip Wilson, the owner of the following described ditch, in compliance with the requirements of the provisions

of General Section No. 1720 of the General Statutes of the State of Colorado, approved April 20th, 1887, and the acts amendatory thereto, do hereby make this statement for filing:

1. The name of the owner of said ditch is Philip Wilson, whose Postoffice address is Fort Collins, County Larimer, Colorado.

2. The name of said ditch is The Bob Creek Ditch.

3. The headgate of said ditch is situated on the left bank of Bob Creek from which stream said ditch diverts its supply of water, at a point whence the north quarter corner of Section three, in T. Nine N., of R. 75 W., bears N. 39° 40′ W. 2195 feet. From the headgate the ditch runs in a general Easterly direction, as shown on the plat hereto attached and made a part of this statement.

4. The length of said ditch is 8130 feet.

5. The width of said ditch on the bottom is 4 feet.

6. The width at the high water line is 6 feet.

7. The depth of water carried in said ditch is 2 feet.

8. The grade of said ditch is 5 feet per mile.

9. The carrying capacity of said ditch is 50 cubic feet of water per second of time.

10. Work was commenced on said ditch on the 24th day of September, A. D. 1897.

* * * of said ditch, as enlarged by this * * * enlargement is —— feet in width on the bottom, —— feet in width at high water mark, and —— feet in depth.

[fol. 3036] * * * capacity arising from such enlargement is —— cubic feet of water per ——. It is the intention by this filing to appropriate all seepage water which naturally finds its way into said Ditch along the line thereof.

* * * was commenced on the — day of —— A. D. 18—.

Witness my hand and seal this 22 day of December, A. D. 1897.

Philip Wilson, (Seal.)

STATE OF COLORADO,
County of Larimer, ss:

E. J. Gregory being first duly sworn, on oath says that he has read the above and foregoing statement and examined the plat thereto attached, and that the matters therein set forth are true of his own knowledge.

E. J. Gregory, Engr.

Subscribed and sworn to before me this 22 day of December, A. D. 1897.

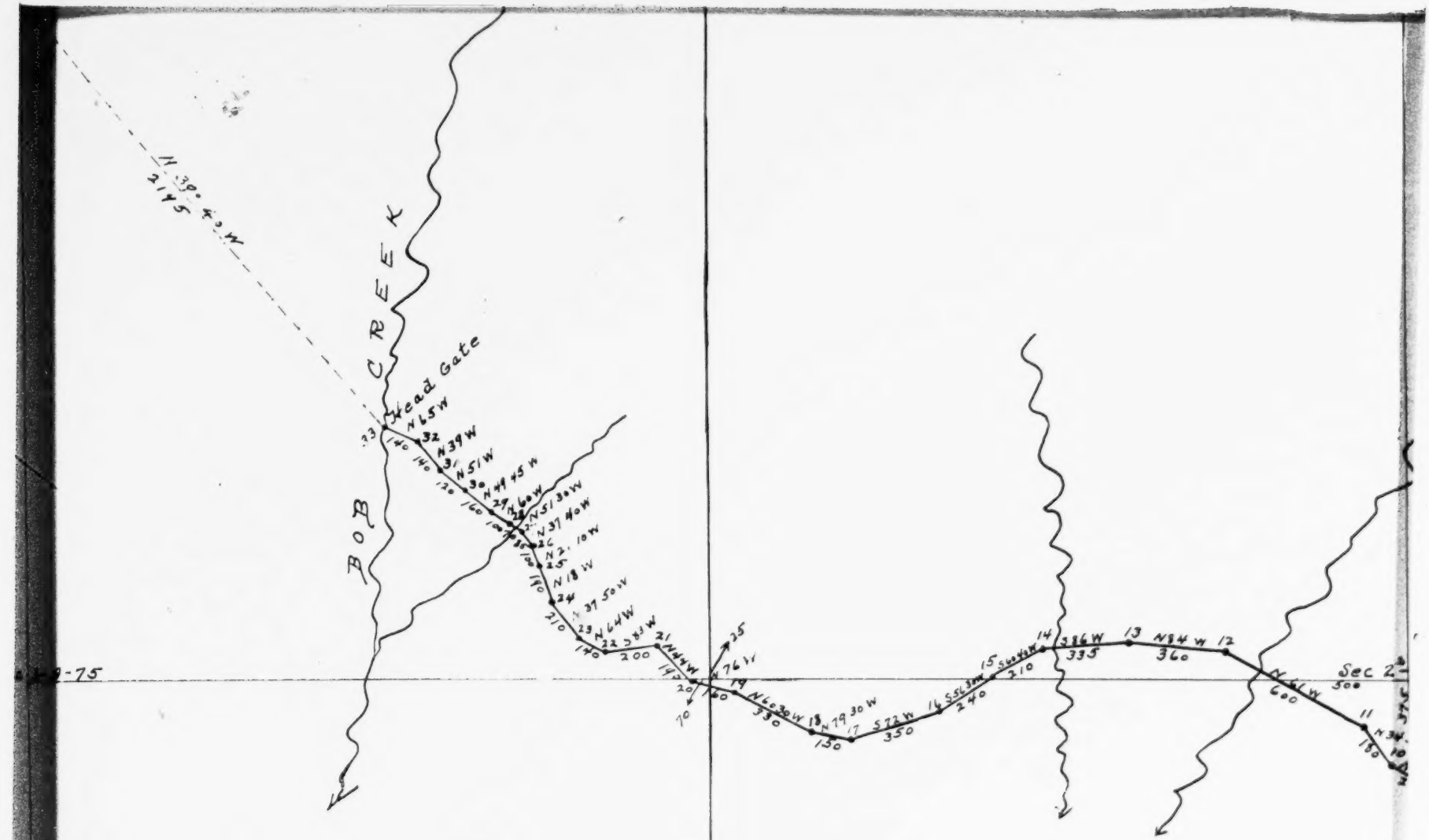
Charles F. Davis, Notary Public. (Seal.)

My commission expires Aug. 18, 1900.

Filed for record at 11:30 o'clock A. M. Dec. 23, 1897.
F. D. Abbott, Recorder, by A. D. Abbott, Deputy.

(Here follows photolithograph of map, side folio 3037)

T A-1



Map of

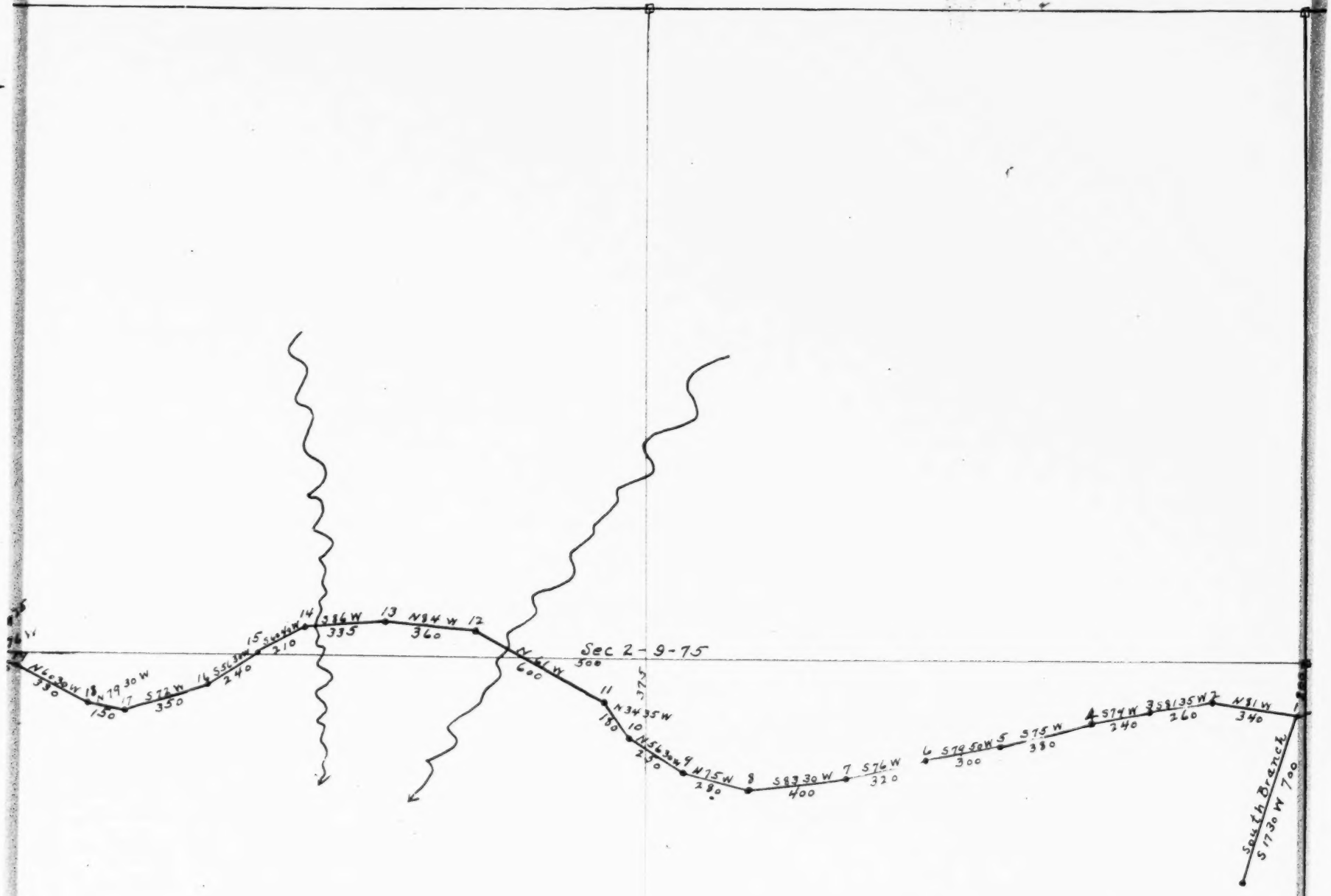
THE BOB CREEK DITCH

Scale 1 inch = 400 ft.

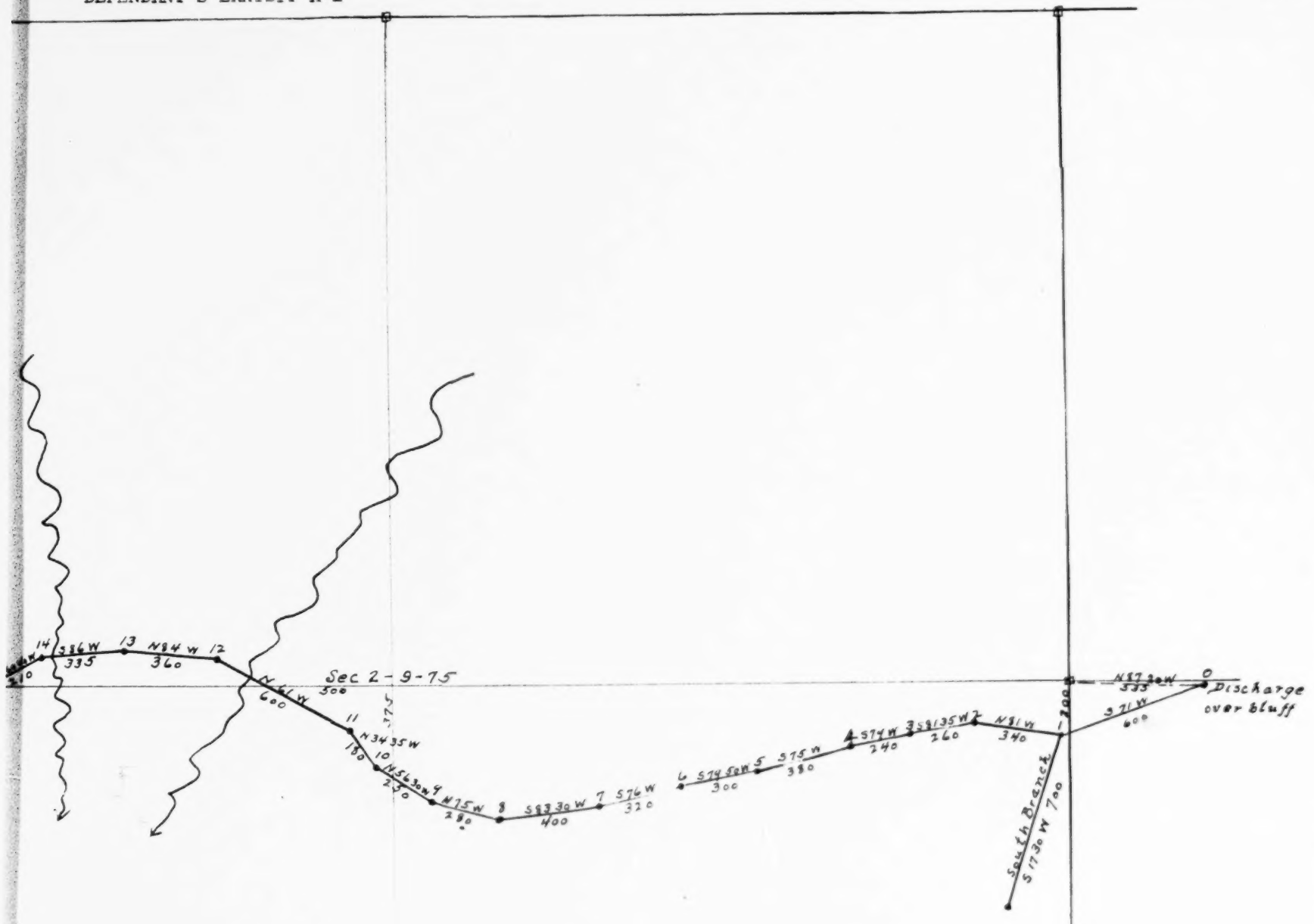
Variation 14° E.

all Government Land

DEFENDANT'S EXHIBIT A-1



DEFENDANT'S EXHIBIT A-1



3037

[fol. 3038] (Certified Copy)

STATE OF COLORADO,
County of Larimer, ss:

I, Hervey D. Hubbell, County Clerk and Recorder in and for said County and State, do hereby certify that the within and foregoing is a full, true and correct copy of Statement of the Bob Creek Ditch, No. 473 as it appears on file in my office in Book —, at page —, File No. 473, Ditches and Reservoirs.

Witness my hand and official seal at Fort Collins, Colorado, this 6th day of June, 1933.

Hervey D. Hubbell, County Clerk and Recorder, Larimer County, Colorado, by —— ——, Deputy.

Issued to Wm. A. Bryans.
No. 2706.
Fee, $2.00.

[fol. 3039] [Endorsed:] Copy. No. 473. Statement of the Bob Creek Ditch. Philip Wilson, Owner.

STATE OF COLORADO,
County of Larimer, ss:

I hereby certify that this instrument was filed in my office at 11:30 o'clock A. M., Dec. 23, 1897.

F. D. Abbott, Recorder, by A. D. Abbott, Deputy.

[fol. 3040] DEFENDANT'S EXHIBIT B-1

Statement of Claim to Water Right

No. 506

Irrigation Division No. 1, Water District No. 48

STATE OF COLORADO,
County of Larimer, ss:

R. Q. Tenney the owner of the following described ditch, in compliance with the requirements of the provisions of General Section No. 1720 of the General Statutes of the State of Colorado, approved April 20th, 1887, and the acts

amendatory thereto, do hereby make this statement for filing:

1. The name of the owner of said ditch is R. Q. Tenney whose postoffice address is Fort Collins Larimer County.

2. The name of said ditch is The Columbine Ditch Extension Ditch.

3. The headgate of said ditch is situated on a ravine on the east line of Sec. 15-10-75 W. at a point 1120 feet north of the SE corner of said Section 15 on said East line from which (ravine) said ditch diverts its supply of water, at a point whence the south east corner of Section 15, in T. 10 N of R. 75 W., bears south, 1120 feet. From the headgate the ditch runs in a general southerly direction, as shown on the plat hereto attached and made a part of this statement.

4. The length of said ditch is 20,615 feet.

5. The width of said ditch on the bottom is four feet.

6. The width at the high water line is seven feet.

7. The depth of water carried in said ditch is two feet.

8. The grade of said ditch is five feet per mile.

9. The carrying capacity of said ditch is 35 cubic feet of water per second of time.

10. Work was commenced on said ditch on the 17 day of September, A. D. 1898.

[fol. 3041] 11. The size of said ditch, as enlarged by this enlargement is —— feet in width on the bottom, —— feet in width at high water mark, and —— feet in depth.

12. The increased capacity arising from such enlargement is —— cubic feet of water per second of time.

13. The work on said enlargement was commenced on the — day of ——, A. D. 18—.

Witness my hand and seal this 15th day of December A. D. 1898.

R. Q. Tenney. (Seal.)

STATE OF COLORADO,
County of Larimer, ss:

R. Q. Tenney being first duly sworn, on oath says that he has read the above and foregoing statement and examined the plat thereto attached, and that the matters therein set forth are true of his own knowledge.

R. Q. Tenney.

Subscribed and sworn to before me this 15 day of December, A. D. 1898.

Charles F. Davis, Notary Public. (Seal.)

My commission expires Aug. 18, 1900.

Filed for record at 8:30 o'clock A. M. Dec. 16, 1898, and duly filed under No. 506.

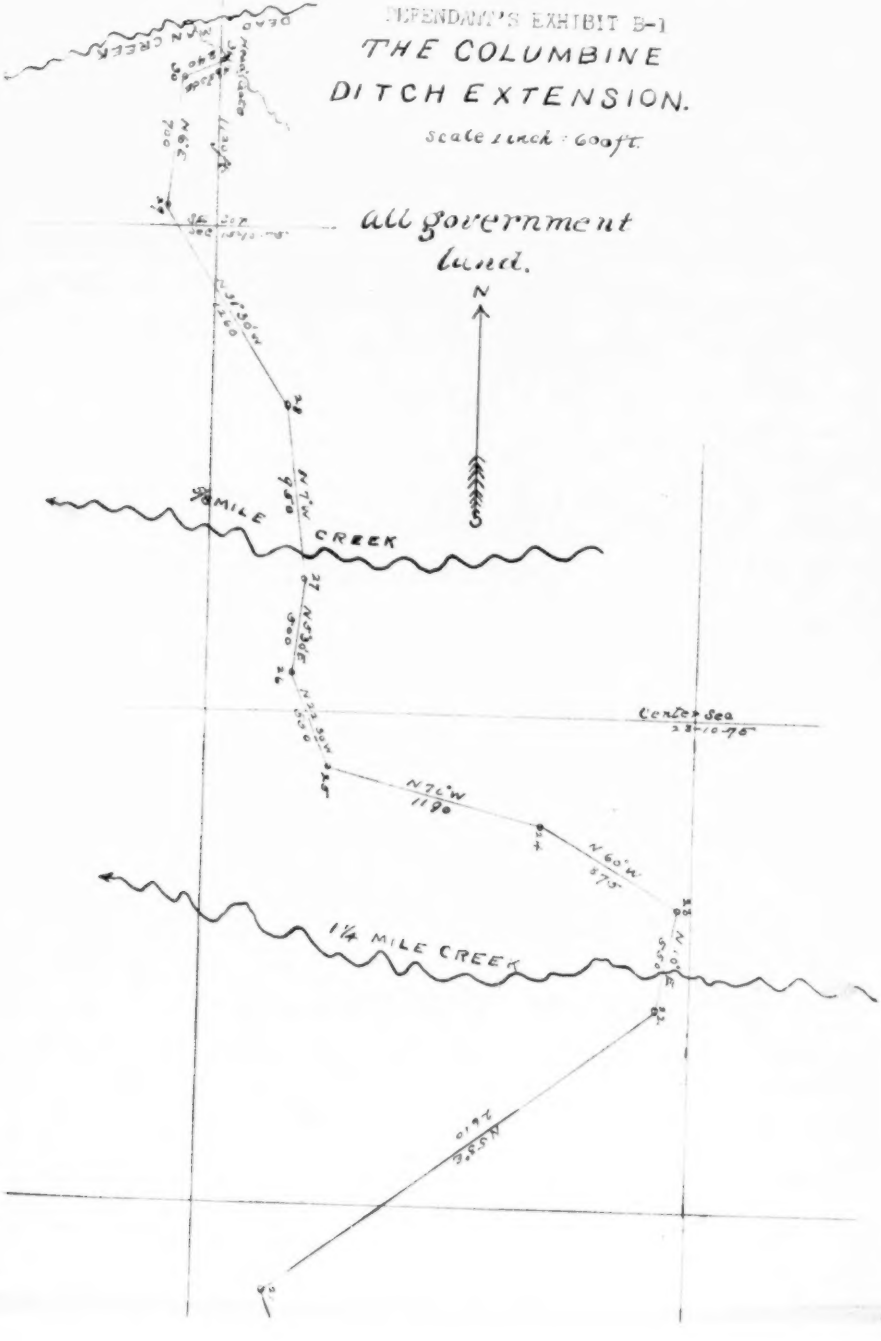
H. E. Tedmon, Recorder, by J. E. Ramer, Deputy.

(Here follows photolithograph of map, side folio 3042)

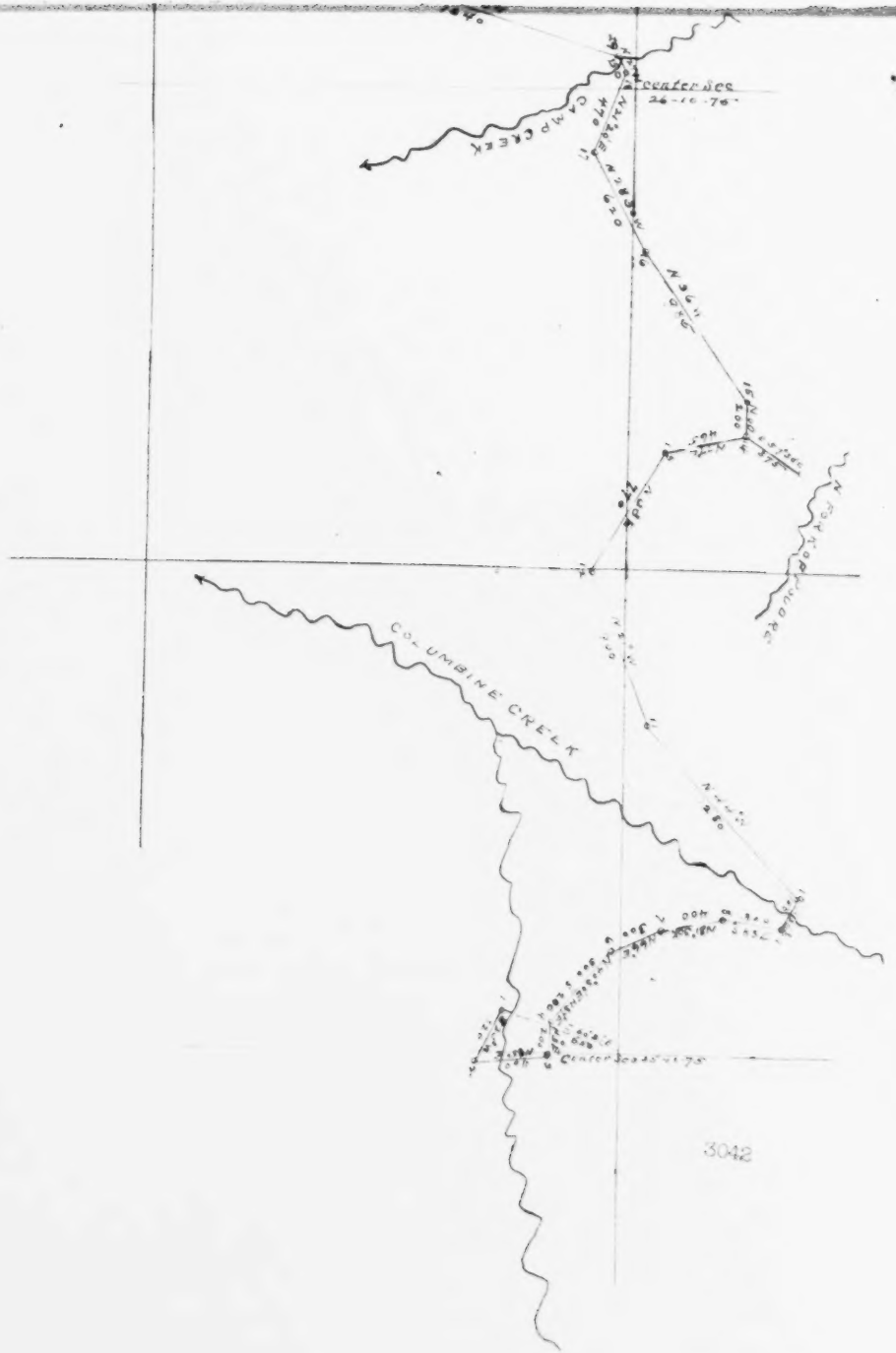
DEFENDANT'S EXHIBIT B-1

THE COLUMBINE DITCH EXTENSION.

Scale 1 inch = 600 ft.



N 72°30'W
1640
CAMP CREEK
Center Sec
26-10-76
COLUMBINE CREEK
N FORK OF POUDRE


CAMP CREEK
COLUMBINE CREEK
3042

[fol. 3043] (Certified Copy)

STATE OF COLORADO,
County of Larimer, ss:

I, Hervey D. Hubbell, County Clerk and Recorder in and for said County and State, do hereby certify that the within and foregoing is a full, true and correct copy of Statement of the Columbine Ditch, No. 506, as it appears on file in my office in book —, at page —, File No. 506 under Ditches and Reservoirs.

Witness my hand and official seal at Fort Collins, Colorado, this 6th day of June, 1933.

Hervey D. Hubbell, County Clerk and Recorder,
Larimer County, Colorado, by —— ——, Deputy.

Issued to Wm. A. Bryans.
No. 2705.
Fee, 2.00.

[fol. 3044] [Endorsed:] Copy. No. 506. Statement of the Columbine Ditch Extension Ditch, R. Q. Tenney, Owner.

STATE OF COLORADO,
County of Larimer, ss:

I hereby certify that this instrument was filed in my office at 8:30 o'clock A. M., Dec. 16, 1898.

H. E. Tedmon, Recorder, by J. E. Ramer, Deputy.

[fol. 3045] DEFENDANT'S EXHIBIT C-1

Statement of the Columbine Ditch

No. 472

Statement of Claim to Water Right

Irrigation Division No. 1, Water District No. 48

STATE OF COLORADO,
Larimer County, ss:

Philip Wilson and Rollin Q. Tenney, the owners of the following described ditch, in compliance with the require-

ments of the provisions of General Section No. 1720 of the General Statutes of the State of Colorado, approved April 20th, 1887, and the acts amendatory thereto, do hereby make this statement for filing:

1. The names of the owners of the said ditch are Philip Wilson and Rollin Q. Tenney, the postoffice address of each of whom is Fort Collins, Colorado, County of Larimer.

2. The name of the said ditch is the Columbine Ditch.

3. The headgates of said ditch are situated respectively on a branch of the Dead Man Creek, on the south side thereof, from which stream the said ditch diverts a portion of its supply of water, at a point whence the *the* quarter corner on the south line of Section 26 in township ten north, range seventy five west of the 6th P. M. in Larimer County, Colorado, bears south two degrees and one minute east 2838 feet; and on the Columbine Creek, on the north side thereof, from which stream the said ditch diverts a portion of its supply of water, at a point whence said quarter corner on the south line of section 26 aforesaid bears north 25 degrees and ten minutes west 2147 feet. From the headgates the ditch runs in a general north east and south east directions, as shown on the plat hereto attached and made a part hereof.

4. The length of said ditch is 6335 feet.

5. The width of said ditch on the bottom is six feet.

6. The width at the high water line is eight feet.

7. The depth of water carried in said ditch is two feet.

8. The grade of said ditch is five and six tenths feet per mile.

9. The carrying capacity of said ditch is 25 cubic feet per second of time.

10. Work was commenced on said ditch on the seventh day of September, A. D. 1897.

Witness our hands and seals this 4 day of December, A. D. 1897.

Rollin Q. Tenney. Philip Wilson.

[fol. 3046] STATE OF COLORADO,
Larimer County, ss:

Rollin Q. Tenney being first duly sworn, on oath deposes and says that he has read the above and for-going statement and examined the plat thereto attached, and further that he was the engineer by whom said ditch was surveyed and said plat drawn, and that the matters therein set forth are true of his own knowledge.

Rollin Q. Tenney.

Subscribed and sworn to before me this 4 day of December, 1897.

Charles F. Davis, Notary Public. (Seal.)

My Commission expires Aug. 18, 1900.

Filed for record at 2:00 o'clock P. M., Dec. 4, 1897.
F. D. Abbott, Recorder; A. D. Abbott, Deputy.

(Here follows photolithograph of map, side folio 3047)

FOLD-OUT IS TOO LARGE TO BE FILMED

[fol. 3048] (Certified Copy)

STATE OF COLORADO,
County of Larimer, ss:

I, Hervey D. Hubbell, County Clerk and Recorder in and for said County and State, do hereby certify that the within and foregoing is a full, true and correct copy of Statement of the Columbine Ditch No. 472 as it appears on file in my office in Book — at page File 472 of Ditches, Reservoirs.

Witness my hand and official seal at Fort Collins, Colorado, this 6th day of June, 1933.

Issued to Wm. A. Bryans.

Hervey D. Hubbell, County Clerk and Recorder, Larimer County, Colorado.

No. 2708 Fee $2.00 By —— ——, Deputy.

[fol. 3049] [Endorsed:] Copy. No. 472. Statement of the Columbine Ditch. Philip Wilson and Rollin Q. Tenney. State of Colorado, County of Larimer, ss. I hereby certify that this Instrument was filed at 2 o'clock P. M., Dec. 4, 1897, in my office. F. D. Abbott, Recorder; A. D. Abbott, Deputy.

[fol. 3050] DEFENDANT'S EXHIBIT D-1

JOHN MCNABB, a witness on behalf of the claimant above named, being first duly sworn, testifies as follows:

Examination by Mr. W. A. Bryans:

Q. State your name, please.
A. John McNabb.
Q. Where do you reside, Mr. McNabb?
A. Fort Collins.
Q. Have you been employed by The Mountain & Plains Irrigation Company?
A. Yes, sir.
Q. In what capacity?
A. Foreman.
Q. Where; on what work?
A. Bob Creek Ditch work.
Q. When did you first see the Bob Creek Ditch?
A. In 1903.
Q. When did you next see it?
A. I went there with Mr. Portner in 1919, I had seen it between times, but don't recollect just when.

Q. What improvements did you find at the time you went there in 1919?

A. The ditch was all completed except the upper end, there were about 500 feet——

Q. Aren't you referring to 1903. I said in 1919 what improvements did you find the ditch?

A. It was all completed and buildings up when I went there in 1919.

Q. In 1903, what was the condition of the ditch?

A. The upper end wasn't completed, about 500 feet that wasn't damned, I completed to about 400 feet of the upper end connected with the creek, and had it up to the flume, there is about 60 or 75 feet of flume, I completed the ditch on the upper end.

Q. After you had completed the work which you stated you did, was the ditch able to carry water?

A. Oh yes.

[fol. 3051] Q. Did it carry water?

A. Well, of course, I don't know, I didn't see it run water.

Q. Have you been in irrigation work for a number of years?

A. Yes, sir.

Q. How long?

A. Since 1891.

Q. In this community.

A. Yes, sir.

Q. From your observation of the ditch, state your opinion as to whether or not the ditch had carried water?

A. Yes, sir, I think it had.

Q. When you went there in 1919 in the fall, did you take a crew of men with you?

A. Yes, sir.

Q. In 1903, did you have a crew of men there?

A. Yes, sir.

Q. About how many men?

A. Seventeen.

Q. How long were you there.

A. About two weeks.

Q. And what improvements, if any, were there at that time?

A. Well, the ditch was all done except the upper end.

Q. Where there any buildings?

A. Yes, sir.

Q. What did they consist of, the buildings?

A. There were three cabins there and a barn and a little water shed house.

Q. By whom were you employed at that time?

A. In 1903, by The Larimer and Weld Reservoir Company.

Q. Do you remember the name of the man who was in charge?

A. Mr. Smille from Eaton.

Q. Is he living?

A. I don't know.

[fol. 3052] Q. Was the weir there?

A. The lower weir was there, the old one, yes, sir.

Q. Can you describe the flume that was there at that time?

A. Yes, sir.

Q. Did you build the flume in 1903?

A. In 1903 I built it.

Q. There was no flume there?

A. No, just a rock slide.

Q. What work did you do in 1919?

A. I built the telephone line clear into camp about 15 miles, then put in some waste gates and cleaned out the ditch.

Q. Who did you do that work for?

A. The Mountain & Plains Irrigation Company.

Q. Have you been employed in the ditch since that date, since 1919?

A. Yes, sir.

Q. For how long?

A. During the summer season, generally about six months in the summer.

Q. Each year?

A. Yes, sir.

Q. And what are your duties, what do you do?

A. Oversee the work and handle it.

Q. Do you go there early in the spring and help remove the snow and oversee that work?

A. Yes, sir.

Q. You are the superintendent of the ditch?

A. Yes, sir.

Q. And how late generally do you stay there?

A. Well, when we are working there, I generally stay until about the first of August, in late years we haven't been doing much the latter part of the year.

Q. For how long a period of time does the water run in the ditch?

A. It runs from along the first of May up to the middle of July.

[fol. 3053] Q. About when does it reach its peak, high point?

A. Along the first of June.

Q. Describe the weir to the Referee that's used for the purpose of calculation.

A. It's 16 feet long, 10 feet wide and 4 feet high.

Q. Do you make daily readings on the weir?

A. Yes, sir.

Q. Does it vary during the day considerably at that altitude?

A. Yes, sir.

Q. When does it reach its highest point, generally?

A. Between three and five o'clock, generally depends on the weather.

Q. At what height have you seen the water in the weir during the peak flow between the hours of three and five o'clock?

A. It runs up to about 1.6 feet in depth, that's about as high as I have seen it.

Q. In your opinion as an irrigation man, how much water would be running in the ditch at a time when the weir showed a rating of 1.6 feet?

A. I would think 50 or 60 feet. I don't have any table for the amount of feet, just read the depth and send that in.

Q. When do you state that you have seen it as high as 1.6 feet?

A. I don't know just when, this year it run 1.3 feet for top, I don't know that its runs up to 1.6 this year.

Q. Does it nearly every year reach a reading of 1.6?

A. I wouldn't think it would, it might most every year for a short time, that's not an average, just the highest peak for the day.

Q. Did you construct this feeder ditch, which has been referred to by Mr. Portner?

A. That was already built.

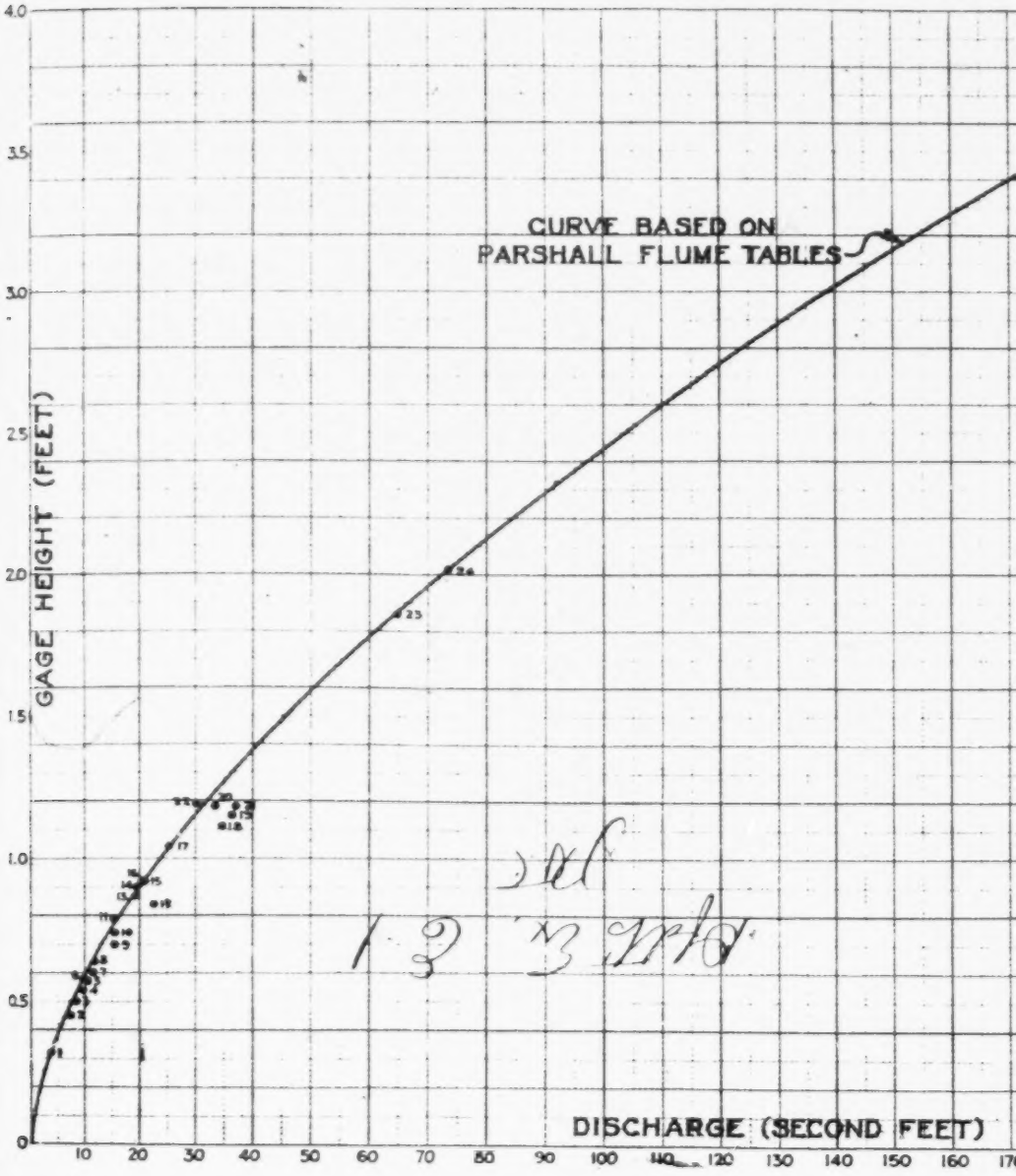
Q. You stated, Mr. McNabb, that it was in 1919 that you built the telephone line, wasn't that in 1921?

A. 1921, yes, sir.

That's all.

(Here follow photolithographs of side folios 3054, 3055 and 3056)

DEFENDANT'S EXHIBIT E-1



-1

CURRENT METER MEASUREMENTS

No.	Date	Gage Height	Disch. Sec. Ft.	Hydrographer
1	4-16-33	0.32	3.83	Meeker
2	8-5-30	0.45	7.28	Baily
3	5-25-27	0.50	8.33	Hinderlider
4	8-3-29	0.54	9.65	Baily
5	7-17-27	0.57	10.47	Parshall
6	10-3-28	0.58	9.85	Rohwer
7	7-6-30	0.60	11.51	Baily
8	9-22-32	0.64	11.76	Whitten
9	7-11-29	0.70	15.35	Meeker
10	7-18-29	0.74	15.36	Baily
11	6-8-30	0.79	15.25	Parshall
12	7-18-29	0.84	22.77	Baily
13	6-8-30	0.87	19.07	Parshall
14	9-3-32	0.90	19.52	Whitten
15	5-24-27	0.92	20.98	Hinderlider
16	5-24-27	0.92	20.51	Hinderlider
17	6-16-27	1.04	25.30	Rohwer
18	7-5-32	1.11	34.68	Hinderlider, Parshall & Field
19	7-5-32	1.15	36.52	Hinderlider, Parshall & Field
20	7-10-32	1.18	33.41	Parshall
21	7-5-32	1.18	37.06	Parshall
22	8-5-32	1.19	30.64	Burgess
23	6-18-32	1.86	64.82	McGraw
24	6-10-27	2.02	73.40	Rohwer

LARAMIE - POUDRE TUNNEL
RATING CURVE
PARSHALL 6 FT. FLUME

170 180 190 200 210 220 230 240 250

6054

DEFENDANT'S EXHIBIT F-1

STATE OF COLORADO
ENGINEERING DEPARTMENT
CURRENT METER NOTES

DATE 14/4/18 1924 TIME { BEGIN ..... END .....

DIV. 1 DIST. 47

Poudre Tunnel RIVER, AT .....

GAGE HT. BEGINNING 0.90 FT. ENDING 0.78 FT. MEAN .84 FT. METER NO. .....

MEAS. Bailey NOTES BY Bailey

Dist. from initial point	Depth	Depth of observat.	Revolutions	Time in seconds	VELOCITY At point	VELOCITY Mean in vertical	VELOCITY Mean in section	Area	Mean Depth	Width	Discharge
1	0					✓	✓	✓			
2	0.3		10	40		.58	.29	.15			0.04
3	0.6		40	48½		2.08	1.33	.45			.60
4	1.1		50	45		2.50	2.28	.85			1.94
5	1.24		50	40		2.81	2.66	1.17			3.11
6	1.36		50	36½		3.08	2.94	1.30			3.82
7	1.36		50	45½		2.48	2.78	1.36			3.78
8	1.22		50	40		2.81	2.64	1.29			3.40
9	1.00		50	37		3.04	2.92	1.11			3.24
10	.76		30	35½		1.90	2.47	.88			2.17
11	.38		5	38		.31	1.10	.57			.63
12	0.1		0			0	.16	.24			.04
		18.2									22.77
Totals											

Dfdts J.1

JRC

PLACE NOTES ON BACK OF SHEET

3055

DEFENDANT'S EXHIBIT G-1

STATE OF COLORADO
ENGINEERING DEPARTMENT

DATE Jul 4 18 19 24 **CURRENT METER NOTES** TIME { BEGIN ..... END .....

DIV. 1 DIST. 47

Poudre Tunnel RIVER, AT .....

GAGE HT. BEGINNING 2.25 FT. ENDING .23 FT. MEAN .74 FT. METER NO. .....

MEAS. Baily NOTES BY Baily

Dist. from initial point	Depth	Depth of observat.	Revolutions	Time in seconds	VELOCITY At point	VELOCITY Mean in vertical	VELOCITY Mean in section	Area	Mean Depth	Width	Discharge
0	0.92		10	30		.76					
1	.90		10	35		.65	.70	.91			.64
2	.94		20	38½		1.18	.92	.91			.84
3	.90		30	36½		1.86	.152	.91			1.38
4	.90		40	40½		2.22	2.04	.90			1.84
5	.90		50	41		2.74	2.48	.90			2.23
6	.90		50	38		2.96	2.85	.90			2.53
7	.90		50	39½		2.84	2.90	.90			2.61
8	.92		50	38½		2.92	2.88	.91			2.62
8.25	.92		50	38½		2.92	2.92	.23	.92		.67
											15.36
Totals											

1485

Dfdts Ex. G. 1

JHC

PLACE NOTES ON BACK OF SHEET

3056

[fol. 3057] DEFENDANT'S EX. H-1

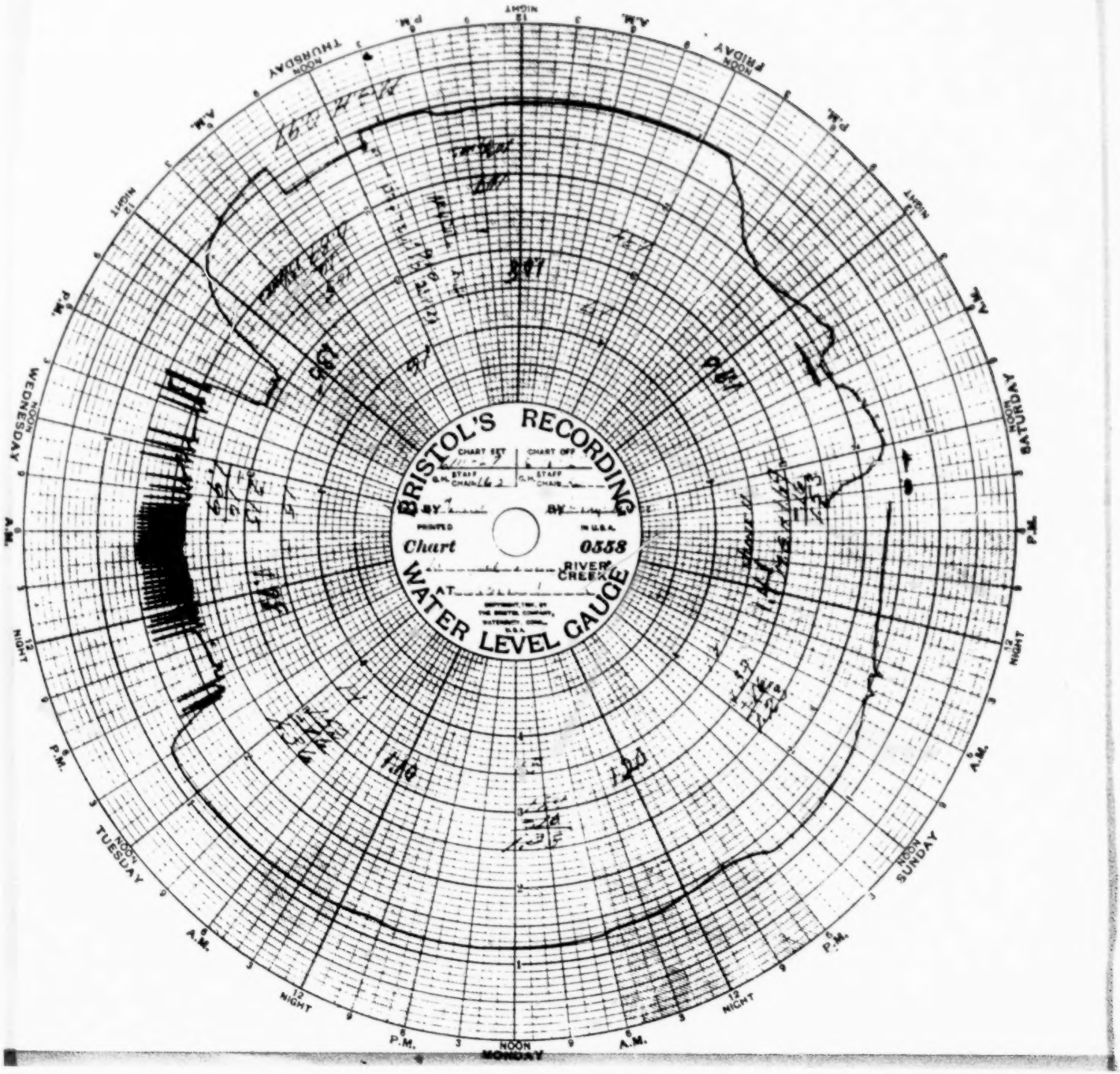
Current Meter Gagings made on 6-foot Parshall Measuring Flume at East Portal of Laramie-Poudre Tunnel

Irrigation Investigations, Bureau of Agricultural Engineering, Colorado Experiment Station, cooperating.

Date	H_a Feet	Comp. Q Sec. Ft.	Current Meter Q Sec. Ft.	Difference Sec. Ft.	Deviation Per cent	Hydrographer
6/10/27	2.025	73.95	73.40	0.55	+ 0.8	Rohwer
6/16/27	1.038	25.47	25.30	0.17	+ 0.7	Rohwer
7/17/27	0.57	9.79	10.47	0.68	− 6.5	Parshall
10/ 3/28	0.58	10.07	9.85	0.22	+ 2.2	Rohwer
6/ 8/30	0.79	16.48	15.25	1.23	+ 8.1	Parshall
6/ 8/30	0.87	19.22	19.07	0.15	+ 0.8	Parshall
7/ 5/32	1.18	31.25	37.06	5.81	−15.7	Parshall
7/10/32	1.18	31.25	33.41	2.16	− 6.5	Parshall

(Here follow photolithographs of Defendant's Exhibits I-1 and J-1, side folios 3058 and 3059)

DEFENDANT'S EXHIBIT I-1



FOLD-OUT IS TOO LARGE TO BE FILMED

[fol. 3060] DEFENDANT'S EXHIBIT K-1

IN THE DISTRICT COURT

STATE OF COLORADO,
County of Larimer, ss:

In the Matter of the Adjudication of Priorities of Right to the Use of Water in Water District No. 48, Division No. 1, of the State of Colorado

STATEMENT OF CLAIM OF PRIORITY OF THE DIVIDE CANAL AND RESERVOIR COMPANY

Comes now The Divide Canal and Reservoir Company, as claimant of water priorities for irrigation and storage in and for said water district No. 48, of the state of Colorado, and makes and files this its statement of claim under oath pursuant to the statute in such case made and provided, as follows:

I

That petitioner is a corporation, duly organized, existing, and doing business under and by virtue of the laws of the state of Colorado; that petitioner is the owner of the Sand Creek Ditch and Reservoir system, so-called; being a system of ditches and reservoirs constructed for the purpose of taking, diverting, and appropriating for beneficial uses, water from the Columbine creek, and its branches, from the Deadman creek, and its branches, and from Sand creek, and its branches, tributaries of the Laramie river, all in Larimer county, Colorado, and to carry the same through and along Sand creek to a point on Sand creek hereinafter described, and thence diverted from Sand creek and carried over and across the Divide, between the head branches of the Laramie and Poudre river, into Sheep creek, a tributary of the Poudre river, to be thence carried down the Poudre river, to sundry places of diversion, all said waters to be used for direct irrigation and for fill-
[fol. 3061] ing reservoir No. 8 and other reservoirs, by claimant and its stockholders by means of the said resevvoirs and the ditch of The North Poudre Irrigation Company, the ditch of The Poudre Valley Irrigation Company, and the ditch of The Larimer and Weld Irrigation Company, in water district No. 3, of the state of Colorado.

II

That it is proposed by said system of ditches and reservoirs to divert and appropriate by means thereof all the water collected and flowing in the south branch of Columbine creek, north branch of Columbine creek, the several branches of Deadman creek, at the points of crossing said streams and water courses, by said line, and also to divert and appropriate the water flowing and to flow in Sand creek, down to the place of diversion from said Sand creek; said waters consisting of the natural flow of all of said streams and their tributaries, the water derived from floods and melting snows, coming into said streams and waterways from the territory adjacent and tributary thereto; that said Sand creek ditch system was originally located and constructed as three separate ditches, to-wit: the Columbine ditch, the Deadman ditch, and the Sand creek ditch, all of which are now surveyed, laid out, and combined as a single ditch and reservoir system, for the purpose of collecting, diverting, and conveying all the water from the said streams, waterways, natural channels, and from the hills, territory, and mountain ranges over and through which said ditch system extends, and to and into the north fork of the Cache la Poudre river, as aforesaid, from thence to be diverted from said river for beneficial uses as aforesaid.

III

That the line and survey of said combined ditch and reservoir system is shown upon the map hereto attached and described by the survey and field notes thereof, as follows, to-wit:

[fol. 3062] Commencing at the original headgate of the Columbine ditch, so-called, at a point on the south branch of the Columbine creek, north 24° 50′ west 2120 feet from the south ¼ corner of section 35, township 10 north, range 75 west. Thence north 38° 15′ east, 1325 feet; thence north 66° 30′ east, 310 feet; thence south 74° 30′ W. 515 feet; thence north 0° 15′ west, 280 feet; thence north 44° 0′ west, 1085 feet; thence north 22° 55′ west 882 feet; thence north 19° 45′ east, 510 feet; thence north 39° 45′ east, 423 1460 feet; thence north 53° 0′ east, 450 feet; thence north east 550 feet; to a point north 76° 40′ east 1200 feet from the south ¼ corner of section 26, said township and range,

to the north fork of the Poudre river, into which, said ditch originally emptied and discharged, the said ditch being changed, starting at station No. 9 as shown by the map, 1200 feet from the said north fork of the Cache la Poudre river, running thence in a northwesterly direction to the original headgate of the Deadman ditch as shown upon said map, said head being located at the point north 22° 10′ west, 950 feet from the south ¼ corner of section 26, township 10 north, range 75 west, said combined ditch running on the original line of the Deadman ditch; thence north 1° 10′ east 727 feet; thence north 41° 30′ west, 640 feet; thence north 15° 15′ west, 286 feet; thence north 12° 0′ east, 410 feet; thence north 63° 30′ west 1135 feet; thence north 63° 30′ west, 637 feet; thence north 38° 35′ west 655 feet; thence north 71° 25′ west, 603 feet; thence north 61° 10′ east, 830 feet; thence north 20° 45′ west, 571 feet; thence north 82° 0′ east, 547 feet; thence north 54° 25′ east, 2155 feet; thence north 46° 10′ west, 553 feet; thence south 84° 0′ west, 490 feet; thence north 55° 0′ west, 352 feet; thence south 58° 0′ west, 905 feet; thence north 69° 45′ west 520 feet; thence south 75° 50′ west 630 feet; thence north 44° 15′ west 1010 feet; thence north 72° 0′ east, 1460 feet; thence north 53° 0′ east 450 feet; thence north 27° 50′ east, 710 feet; thence south 76° 15′ west 1200 feet; thence north 82° 40′ west, 818 feet; thence north 31° 0′ west, 290 feet; thence north 31° 0′ east, 1063 feet; thence north 15° 30′ west, 570 feet; thence north 66° 30′ east, 627 feet; thence north 52° 20′ east, 1115 feet; thence north [fol. 3063] 24° 0′ east, 360 feet; thence north 25° 15′ west, 350 feet; thence south 61° 15′ west, 819 feet; thence north 82° 55′ west, 907 feet; thence north 57° 0′ west, 755 feet; thence north 15° 0′ west, 740 feet; thence north 80° 28′ west, 643 feet; thence north 70° 0′ west, 1485 feet; thence north 50° 10′ west, 930 feet; to a point south 7° 25′ E. 2100 ft. from NW cor. sec. 15-10-75 to Sand creek, another tributary of the Laramie river, where said Columbine and Deadman ditches empty and discharge the waters appropriated from said stream, thence following the channel of Sand creek, and using the same as a ditch to carry said waters, and by various courses and distances for about 3½ miles to the original headgate of Sand creek ditch, so-called, said Sand creek ditch to be hereafter used to carry

and discharge the accumulated waters from all sources over the Divide into the north fork of the Cache la Poudre river for the purposes above mentioned, said point of departure or head of Sand creek ditch being at a point south 84° 45′ east, 560 feet, from the south ¼ corner of section 22, township 11, north, range 75 west; thence north 29° 0′ east, 290 feet; thence north 42° 0′ east, 1000 feet; thence north 88° 45′ east, 260 feet; thence north 9° 30′ east, 700 feet; thence north 22° 30′ east, 195 feet; thence north 22° 30′ east, 50 feet; (the last 2 courses and distances being through tunnel;) thence north 11° 30′ east, 128 feet; thence north 56° 30′ east, 230 feet; thence north 55° 0′ east, 650 feet; thence south 87° 0′ east, 160 feet; thence north 60° 30′ east, 530 feet; thence north 40° 0′ east, 300 feet; thence north 46° 45′ east, 490 feet; thence north 77° 30′ east, 415 feet; thence south 81° 30′ east, 388 feet; thence south 82° 0′ east, 480 feet; thence north 81° 0′ east, 195 feet; thence north 35° 30′ east, 265 feet; thence north 58° 30′ east, 180 feet; to a point south 10° 25′ west, 1500 — from the north ¼ corner of section 23, township 11, north, range 75 west, to Sheep creek, a tributary of the north fork of the Cache la Poudre river, said waters being conveyed along and through a channel or waterway of Sheep creek to the north fork of the Cache la Poudre river, and thence carried down said river and again diverted by the ditches and ditch systems above mentioned.

IV

The claimant is also the owner of four small reservoirs, [fol. 3064] numbered one, two, seven, and ten, along the line of Sand Creek above mentioned in which the waters derived from Columbine and Deadman creek are to be collected and stored for temporary purposes, and to be afterwards drawn off and carried down Sand creek through the ditches and outlets above described to the Cache la Poudre river, the location of said reservoirs being shown upon the map hereto attached.

V

That part of the ditches above described, formerly known as Columbine ditch, was laid out and built to the dimensions and capacity, as follows: width on bottom about 4 feet,

depth about 3 feet, width on top, 7 feet, and grade of about 10 feet to the mile, with a capacity for the carriage of water of about 50 cubic feet per second of time.

That the Deadman ditch, so-called, at the head, has dimensions and capacities of about 4 feet wide on the bottom, 7 feet wide on top, 3 feet deep, and a carrying capacity of about 50 cubic feet per second of time, increasing in size and capacity so as to take and carry the increased quantities derived from the various branches of Deadman creek and streams and water courses crossed by said ditch, down to Sand creek, and at said Sand creek and above where said ditch empties into Sand creek, it has the dimensions and capacity following: 8 feet wide on the bottom, 13 feet wide on the top, carrying 3 feet in depth of water, with a grade of about 10 feet to the mile and a carrying capacity of 250 cubic feet per second of time; that the capacity of said ditch from the point where it leaves Sand creek, and originally known as Sand creek ditch, running thence to Sheep creek, is as follows: Width on bottom about 10 feet, width on top about 16 feet; carrying 5 feet in depth of water with a grade of 10 feet to the mile, with a carrying capacity of 500 cubic feet per second of time; that the entire length of said ditch system is about eleven miles.

That work was commenced on said system by surveys during the month of June, 1897, and by actual work of construction on the right of way, was commenced in June, 1899, since which time work has been prosecuted with diligence and water diverted by means of said ditches and carried over the divide as aforesaid into Sheep creek and thence down the Cache la Poudre river and applied to the beneficial uses as aforesaid.

Wherefore, claimant prays that he may be allowed appro- [fol. 3065] priations of water from the said Columbine, Deadman, creeks and their branches, in the amount of two hundred and fifty (250) cubic feet per second of time, with the right to carry the same through, and along, the channel of Sand creek, and again divert the same to the Cache la Poudre river, through the Sand creek ditch above described.

That claimant be made a further appropriation from Sand creek and the waters coming into the same from its watershed and tributaries to the amount of two hundred and fifty (250) cubic feet per second of time, or in all of

five hundred (500) cubic feet per second of time for the uses and purposes aforesaid, said appropriations to date from the 15th day of June, 1899.

James W. McCreery, 7 and 9, Bank Block, Greeley, Colorado, Attorney of claimant, The Divide Canal and Reservoir Company.

STATE OF COLORADO,
County of Weld, ss:

Bruce G. Eaton, being first duly sworn, deposes and says:

That he is the president of The Divide Canal and Reservoir Company, claimant above named; that he has read the above and foregoing statement, and knows the contents thereof; that the same is true to the best of his knowledge and belief.

——— ———.

Sworn to before me and subscribed in my presence by the said Bruce G. Eaton this second day of March, A. D. 1906. My commission expires February 20, 1908.

Henry Clay Luther, Notary Public in and for the county of Weld and state of Colorado.

[fol. 3066] [Endorsed:] No. 1885. In the District Court of Larimer County. In the matter of the adjudication of priorities of right to the use of water in Water District No. 48, Division No. 1, of the State of Colorado. Statement of claim of priority of The Divide Canal and Reservoir Company. Jas. W. McCreery, Esq., Greeley, Colorado, attorney for said company.

[fol. 3067] DEFENDANT'S EXHIBIT L-1

IN THE DISTRICT COURT

STATE OF COLORADO,
County of Larimer, ss:

In the Matter of the Adjudication of Priorities of Right to the Use of Water in Water District No. 48, Division No. 1, of the State of Colorado

Amendment to Statement of Claim to Priority of The Divide Canal and Reservoir Company

Comes now The Divide Canal and Reservoir Company, as claimant of water priorities for irrigation and storage

in and for said water district number forty-eight of the state of Colorado, and makes and files this its amendment to the statement of claim heretofore filed herein, as follows:

I

That the description and meander of Sand creek between the points where the Deadman ditch discharges into Sand creek, and where the Sand creek ditch so-called, is taken and diverted therefrom, is as follows:

Commencing at a point 2100 feet south, 7° 25′ east from south west corner of section 10, township 10 north, range 75 west; thence north 47° 0′ west, 910 feet; thence north 35° 0′ west, 1540 feet; thence north 22° 20′ east, 475 feet; thence north 19° 0′ east, 530 feet; thence north 21° 0′ west, 275 feet; thence north 58° 10′ west, 980 feet, through reservoir No. 2; thence north 62° 30′ west, 295 feet, site for dam; thence south 19° 0′ west, 374 feet, along dam; thence north 59° 0′ west, 780 feet along creek; thence north 45° [fol. 3068] 45′ west, 500 feet; thence north 82° 0′ west, 510 feet; thence south 23° 0′ west, 500 feet to reservoir No. 10; thence south 75° 0′ west, 1150 feet; thence north 30° 0′ west, 700 feet; thence north 19° 30′ west, 280 feet; thence north 9° 0′ east, 167 feet; thence north 4° 0′ west, 360 feet; thence north 28° 30′ east, 300 feet; thence north 56° 30′ east, 1060 feet; thence north 75° 30′ east, 255 feet; thence north 29° 0′ east, 420 feet, through reservoir No. 7; thence north 0° 15′ east, 475 feet, through reservoir No. 7; thence north 13° 0′ east, 600 feet, through reservoir No. 7; thence north 25° 30′ east, 315 feet, through reservoir No. 7; thence north 22° 0′ east, 390 feet; thence north 19° 30′ east, 600 feet; thence north 2° 30′ west, 445 feet; thence north 15° 0′ east, 90 feet; thence north 27° 30′ east, 400 feet; thence north 42° 30′ east, 185 feet; thence north 52° 30′ east, 207 feet; thence north 79° 0′ east, 200 feet; thence north 42° 0′ east, 120 feet; thence north 14° 30′ east, 168 feet; thence north 51° 30′ east, 420 feet; thence north 42° 0′ east, 150 feet; thence north 75° 0′ east, 148 feet; thence north 54° 0′ east, 230 feet; thence north 35° 30′ east, 270 feet; thence north 21° 30′ east, 205 feet; thence north 62° 0′ east, 140 feet; thence south 88° 30′ east, 230 feet; thence north [fol. 3069] 66° 30′ east, 180 feet; thence north 88° 0′ east, 165 feet; thence north 49° 0′ east, 170 feet; thence north 46° 0′ east, 200 feet; thence north 41° 0′ east, 158 feet;

thence north 61° 0′ east, 190 feet; thence north 38° 30′ east, 145 feet; thence north 51° 0′ east, 285 feet; thence north 19° 0′ east, 125 feet; thence north 34° 30′ east, 150 feet; thence north 18° 30′ east, 215 feet; thence north 46° 0′ east, 116 feet; thence north 5° 0′ east, 86 feet; thence north 19° 30′ east, 170 feet; thence north 24° 0′ east, 180 feet; thence north 15° 0′ west, 140 feet; thence north 18° 30′ east, 205 feet; thence north 6° 0′ east, 110 feet; thence north 6° 0′ west, 125 feet; thence north 5° 30′ east, 240 feet; thence north 36° 0′ east, 140 feet; thence north 64° 0′ east, 270 feet; thence north 45° 0′ east, 156 feet; thence north 46° 0′ east, 160 feet; thence north 71° 0′ east, 135 feet; thence north 60° 0′ east, 340 feet; thence north 67° 30′ east, 240 feet; thence north 54° 0′ east, 305 feet; thence north 86° 30′ east, 180 feet; thence north 56° 0′ east, 175 feet; thence north 46° 0′ east, 185 feet; thence north 24° 40′ east, 165 feet; thence north 37° 30′ east, 165 feet; thence north 37° 30′ east, 140 feet; thence north 29° 30′ east 125 feet; thence north 21° 30′ east, 140 feet; thence north 0° 0′ east, 215 feet; thence north 20° 30′ west, 195 feet; thence north 6° 0′ west, 182 feet; thence north 24° 30′ west, 150 feet; thence north 6° 0′ west, 93 feet; thence north 37° 30′ west, 90 feet; thence south 72° 0′ west, 73 feet; thence north 70° 0′ west, 70 feet; thence north 14° 0′ east, 72 feet; thence north 2° 0′ west, 90 feet; thence north 12° 30′ west, 140 feet; thence north 14° 30′ east, 180 feet; thence north 43° 30′ east, 85 feet; thence north 79° 30′ east, 130 feet; thence north 69° 30′ east, 115 feet; thence north 17° 30′ east, 140 feet; thence north 31° 30′ east, 140 feet; thence north 22° 0′ east, 68 feet; thence north 20° 0′ east, 100 feet; thence north 3° 0′ east, 76 feet; thence north 8° 30′ east, 96 feet; thence north 12° 30′ west, 145 feet; [fol. 3070] thence north 7° 30′ west, 98 feet; thence north 28° 30′ east, 55 feet; thence north 0° 30′ east, 55 feet; thence north 17° 30′ east, 98 feet; thence north 12° 30′ east, 50 feet; thence north 11° 0′ west, 65 feet; thence north 34° 0′ east, 52 feet; thence north 3° 0′ east, 63 feet; thence north 21° 30′ east, 70 feet; thence north 8° 0′ west, 80 feet; thence north 6° 30′ east, 76 feet; thence north 51° 30′ east, 100 feet; thence north 21° 0′ east, 145 feet; thence north 37° 30′ east, 140 feet; thence north 4° 0′ east, 220 feet; thence north 5° 0′ east, 106 feet; thence north 41° 30′ west, 160 feet; thence north 8° 30′ east, 85 feet; thence north 39° 0′

west, 172 feet; thence north 31° 30′ west, 230 feet; thence north 48° 0′ east, 62 feet; thence north 21° 30′ west, 83 feet; thence north 18° 30′ west, 53 feet; thence north 2° 0′ east, 128 feet; thence north 12° 30′ east, 105 feet; thence north 10° 0′ east, 125 feet; thence north 0° 0′ east, 110 feet; thence north 13° 0′ west, 90 feet; thence north 18° 30′ west, 66 feet; thence north 3° 0′ west, 130 feet; thence north 10° 0′ west, 125 feet; thence north 20° 30′ east, 78 feet; thence north 1° 0′ east, 52 feet; thence north 39° 0′ east, 47 feet; thence north 30° 0′ east, 64 feet; thence north 10° 30′ west, 90 feet; thence north 12° 30′ west, 190 feet; thence north 63° 0′ west, 112 feet; thence north 54° 0′ west, 70 feet; thence north 34° 0′ west, 72 feet; thence north 41° 0′ west, 73 feet; thence north 34° 0′ west, 90 feet; thence north 7° 0′ west, 115 feet; thence north 14° 0′ east, 105 feet; thence north 4° 30′ east, 94 feet; thence north 24° 0′ east, 120 feet; thence north 2° 30′ west, 400 feet; thence north 57° 30′ west, 125 feet; thence north 17° 0′ west, 80 feet; thence north 5° 30′ west, 110 feet; thence north 12° 30′ west, 78 feet; thence north 32° 0′ west, 90 feet; thence north 10° 0′ east, 300 feet; thence north 3° 30′ east, 340 feet; thence north 48° 0′ east, 135 feet; thence north 46° 0′ east, 148 feet; thence south 88° 30′ east, 100 feet to headgate of the Sand creek ditch. That the capacity [fol. 3071] of said Sand creek as above described for the carriage of water is more than 500 cubic feet per second of time, the same being a natural channel or waterway collecting and draining a large watershed and territory and being supplied chiefly by rains, floods, and melting snows, falling upon and coming into the said watershed; that the said Deadman creek and the sources of supply of the Deadman ditch, discharged as aforesaid, into said Sand creek, do not naturally discharge or come into the said Sand creek, but are turned in Sand creek, and proposed to be turned into Sand creek by means of the Deadman and Columbine ditches as aforesaid.

II.

That the description of reservoirs Nos. 2, 7, and 10, above mentioned, which reservoirs are supplied from said Deadman creek, from the waters of said Sand creek, is as follows, to-wit:

No. 10. Commencing at a point 1065 feet north, 15°, 0′ east, from the southwest corner of section 9, township 10 north, range 75 west; thence north 21°, 15′ west, 460 feet; thence south 65°, 0′ west, 255 feet; thence south 65°, 5′ west, 395 feet; thence south 57°, 35′ west, 488 feet; thence south 23°, 0′ west, 360 feet; thence south 33°, 25′ east, 245 feet; thence south 42°, 35′ east, 325 feet; thence south 70°, 25′ east, 290 feet; thence north 35°, 20′ east, 205 feet; thence north 9° 40′ east, 280 feet; thence north 30° 40′ east, 405 feet; thence north 57° 20′ east, 260 feet, to point of beginning, containing 22.90 acres, with a total storage capacity of 10,000,000 cubic feet of water.

No. 2. Commencing at a point 1345 feet north, 17° 30′ east, from the south ¼ corner of section 9, township 10 north, range 75 west; thence south 73° 30′ east, 420 feet; thence south 73° 30′ east, 478 feet; thence north 81° 30′ east, 254 feet; thence north 18° 28′ west, 365 feet; thence north 16° 0′ east, 108 feet; thence north 57° 28′ west, 108 [fol. 3072] feet; thence north 75° 50′ west, 280 feet; thence south 83° 35′ west, 295 feet; thence north 83° 55′ west, 265 feet; thence south 18° 10′ west, 374 feet; to point of beginning, containing 11.4 acres, with a total storage capacity of 6,500,000 cubic feet of water.

No. 7. Commencing at a point 167 feet north, 30° 0′ west, from the north ¼ corner of section 9, township 10 north, range 75 west and thence north 40° 0′ west, 648 feet; thence south 75° 10′ west, 315 feet; thence south 0° 30′ east, 430 feet; thence south 18° 28′ east, 665 feet; thence south 9° 45′ east, 180 feet; thence south 11° 15′ west, 282 feet; thence south 29° 30′ west, 248 feet; thence north 88° 25′ east, 250 feet; thence north 54° 15′ east, 200 feet; thence north 23° 0′ east, 265 feet; thence north 27° 30′ east, 140 feet; thence north 8° 15′ east, 190 feet; thence north 0° 40′ west, 142 feet; thence north 5° 45′ west, 120 feet; thence north 13° 45′ west, 145 feet; thence north 15° 20′ east, 215 feet; thence north 40° 7′ east 72 feet, to point of beginning, containing 21.90 acres, with a total storage capacity of 10,350,000 cubic feet of water.

III.

That The Divide Canal and Reservoir Company claims the right to appropriate all of said waters flowing in Sand creek for the filling of said reservoirs and for the use of the same

for irrigation in the watershed of the Cache la Poudre river, as aforesaid, and also claims the right to use and employ said channel above described for the carriage of said water as a part of its said Sand creek ditch system and to divert both the waters not only flowing in said Sand creek but as well the waters turned into the same and stored in said reservoirs above described, as aforesaid, through and by means of the Sand creek ditch herein described and to carry all of said waters from and through said Sand creek ditch over and across the divide into Sheep creek, and [fol. 3073] thence into the Cache la Poudre to be again diverted for storage in reservoirs and for irrigation in the valley of the Cache la Poudre river and within water district No. 3 of the state of Colorado. That the amount of water claimed is available for and required for the irrigation of upwards of 20,000 acres of land belonging to stockholders of claimant and others.

James W. McCreery, 7 and 9 Bank Block, Greeley, Colorado, Attorney for The Divide Canal and Reservoir Company.

STATE OF COLORADO,
County of Weld, ss:

Bruce G. Eaton, being first duly sworn deposes and says:

I am president of The Divide Canal and Reservoir Company, the claimant above named; I have read the above and foregoing amendment to statement of claim to priority heretofore filed herein by said company and know the contents thereof. The same is true to the best of my knowledge and belief.

Bruce G. Eaton.

Sworn to before me and subscribed in my presence by the said Bruce G. Eaton this 10th day of March, A. D. 1906.

My commission as notary public in and for Weld county, State of Colorado, will expire February 20, 1908.

Henry Clay Luther, Notary Public in and for the County of Weld and State of Colorado. (Seal.)

[fol. 3074] STATE OF COLORADO,
Larimer County, ss:

I, W. P. Hurley, Clerk of the District Court of Larimer County, in the State aforesaid, do hereby certify the above

and foregoing to be a true, perfect and complete copy of Amendment to Statement of Claim to Priority of The Divide Canal and Reservoir Company in a certain cause lately pending in said Court, entitled In the Matter of the Adjudication of Priorities of Right to the Use of Water in Water District No. 48, Division No. 1, of the State of Colorado, being Case No. 1885 in this Court.

In witness whereof I have hereunto set my hand and affixed the seal of said Court, at Fort Collins, Colorado, this 6th day of June, A. D. 1933.

W. P. Hurley, Clerk; by Gertrude Fritz, Deputy.

(Seal District Court, Larimer County, Colorado.)

(Here follows photolithograph of map, Defendant's Exhibit M-1, side folios 3075-3076)

FOLD-OUT IS TOO LARGE TO BE FILMED

[fol. 3077] DEFENDANT'S EXHIBIT N-1

This agreement made and entered into this fifth day of September, A. D. 1898, by and between Philipp Wilson of the County of Larimer and State of Colorado, party of the first part, and B. H. Eaton, of the County of Weld, in the state aforesaid, party of the second part,

Witnesseth, that said first party, for and in consideration of the payment to him of the sum of fifteen hundred dollars by said second party, in manner hereinafter set forth, hereby sells, transfers, conveys and assigns unto said *said* B. H. Eaton, his heirs and assigns, an entire undivided two thirds interest in and to that certain appropriation of water from the Deadman creek and Sand Creek in said Larimer County which is particularly set forth and described in a plat and statement filed in the office of the Clerk and Recorder of Larimer County, Colorado, on the 22" day of July, A. D. 1897, and numbered by the file number of said office and named the Wilson Supply Ditch.

And said B. H. Eaton, second party above named, for himself, his heirs, administrators and assigns, in consideration of the premises, agrees to pay to said Philipp Wilson, first party above named, the full sum of fifteen hundred dollars, in manner following, towit: Five hundred dollars thirty days after the ensealing of these presents, without interest; and one thousand dollars one year after the date of these presents, with interest at the rate of six per cent. per annum from this date until paid.

It is understood and agreed by the parties hereto that any payment by said Eaton on this agreement shall be forfeit to said Wilson in case of the failure by said Eaton to complete the payment of the full amount agreed upon, and the title to the said property shall not vest in said Eaton, until the full sum of fifteen hundred dollars shall have been [fol. 3078] paid to the said Wilson, his heirs or assigns.

And it is further agreed by and between the parties hereto that the sum of fifty dollars already paid by said Eaton to said Wilson is intended as a forfeit only, in case of the failure by said Eaton to consummate the purchase as above provided, and it is not in any event to be considered as a part of the fifteen hundred dollars purchase money hereinbefore named.

In witness whereof the parties hereto have signed their names to this writing, drawn in duplicate, the day and year first above written.

Philip Wilson, B. H. Eaton.

Fort Collins, Colo., Oct. 8, 1898.

B. H. Eaton has this day paid to Philip Wilson on this contract Five hundred dollars in my presence.

R. Q. Tenney.

[fol. 3079] [Endorsed:] Agreement. B. H. Eaton and Philip Wilson. Sale of ⅔ interest. Wilson Supply Ditch.

(Here follows photolithograph of map, Defendant's Exhibit O-1, side folio 3080)

FOLD-OUT IS TOO LARGE TO BE FILMED

[fol. 3081] DEFENDANT'S EXHIBIT P-1

This Deed, made this 30th day of November, in the year of our Lord one thousand nine hundred and one, between Philip Wilson of the County of Larimer and State of Colorado, of the first part, and the Divide Ditch Company, a corporation, doing business under and by virtue of the laws of Colorado, of the County of — and State of Colorado, of the second part:

Witnesseth: That the said party of the first part, for and in consideration of the sum of One Dollar and other valuable considerations, to the said party of the first part in hand paid by the said party of the second part, the receipt whereof is hereby confessed and acknowledged, has remised, released, sold, conveyed and quit claimed, and by these presents does remise, release, sell, convey and quit claim unto the said party of the second part, its successors and assigns forever, all the right, title, interest, claim and demand which the said party of the first part has in and to the following described property situate, lying and being in the County of Larimer and State of Colorado, to-wit: All of the rights, privileges and franchises of and in that certain claim and appropriation of water known as the Wilson Supply Ditch, statement for which was filed in the office of the Clerk of said Larimer County on the 22nd day of July, 1897, and in said statement described as follows, to wit: The Wilson Supply Ditch having headgate at a point on Deadman Creek which bears due north from the southeast corner of Sec. 15 in township 10 north of range 75 west in said Larimer County, 750 feet and having gate discharging water into Sand Creek at a point on the south bank thereof which bears due north from the quarter corner on the south side of Sec. 9 in township 10 north of range 75 west in said Larimer County 1480 feet, at which point said Sand Creek assumes a well defined channel; said ditch thence following the bed of Sand Creek to a point which bears south 53° west from the quarter corner on the west side of Sec. 23 in township 11 north of range 75 west in said Larimer County 370 feet, at which period is located a headgate by which the water hereby appropriated is diverted from said Sand Creek, it being the intention hereby to appropriate all the water from Deadman Creek which naturally finds its way into the

ditch herein described and the water from the streams, valleys and natural depressions intersected by said ditch and lying above the source and all water of Sand Creek which now reaches the headgate last above described, not heretofore appropriated, it being also the intention hereby to divert the water herein appropriated from the water-shed of the Big Laramie River into the water-shed of the Cache la Poudre River.

To have and to hold the same, together with all and singular the appurtenances and privileges thereunto belonging, or in anywise thereunto appertaining, and all the estate, right, title, interest and claim whatsoever, of the said party of the first part, either in law or equity, to the only proper use, benefit and behoof of the said party of the second part, his heirs and assigns forever.

In witness whereof, the said party of the first part has hereunto set his hand and seal the day and year first above written.

Philip Wilson, (Seal.)

[fol. 3081a] STATE OF COLORADO,
County of Larimer, ss:

I, Charles F. Davis, Notary Public in and for said County, in the State aforesaid, do hereby certify that Philip Wilson, who is personally known to me to be the person whose name is subscribed to the foregoing deed, appeared before me this day in person, and acknowledged that he signed, sealed and delivered the said instrument of writing as his free and voluntary act, for the uses and purposes therein set forth.

Given under my hand and notarial seal, this 30th day of November, A. D. 1901.

Charles F. Davis, Notary Public. (Seal)

My commission expires Dec. 6, 1904.

[Endorsed:] No. 71134. Quit Claim Deed. Philip Wilson, to The Divide Ditch Company, for Wilson Supply Ditch.

STATE OF COLORADO,
County of Larimer, ss:

I hereby certify that this instrument was filed for record in my office at 8:52 o'clock A. M., Feb. 3, 1902, and is duly recorded in Book 151, page No. 193.

J. E. Ramer, Recorder, by F. J. Barnett, Deputy.

Fees, $—.

In District Court, Larimer County, Colo. 2196.
Filed in District Court, Larimer County, Colo., Apr. 27, 1910. Harry H. Hartman, Clerk.

[fol. 3082] STATE OF COLORADO,
County of Larimer, ss:

I, F. J. Burnett, Deputy County Clerk in and for said County, in the State aforesaid, do hereby certify that the above and foregoing is a full, true and complete transcript of Quit Claim Deed, Philip Wilson to Divide Ditch Company, which was filed in this office the 3" day of Feb'y, A. D. 1902, and recorded in Book 151, on page 193, of said Larimer County Records.

In testimony whereof I have hereunto set my hand and affixed the seal of said County, at Fort Collins, this 9 day of June, 1902.

J. E. Ramer, County Clerk and ex-Officio Recorder;
F. J. Burnett, Deputy. (Seal.)

[fol. 3083] DEFENDANT'S EXHIBIT Q-1

This deed, made this 2 day of December, in the year of our Lord one thousand nine hundred and one, between Rollin Q. Tenney, of the County of Larimer and State of Colorado, of the first part, and The Divide Ditch Company, a corporation, of the County of —— and State of Colorado, of the second part:

Witnesseth: That the said party of the first part, for and in consideration of the sum of One Dollar and other valuable considerations, to the said party of the first part in hand paid by the said party of the second part, the re-

ceipt whereof is hereby confessed and acknowledged, has remised, released, sold, conveyed and quit claimed, and by these presents does remise, release, sell, convey and quit claim unto the said party of the second part *his* its successors and assigns forever, all the right, title, interest, claim and demand which the said party of the first part has in and to the following described property situate, lying and being in the County of Larimer and State of Colorado, to-wit: All of the rights, privileges and franchises of and in that certain claim and appropriation of water known as the Wilson Supply Ditch, statement for which was filed in the office of the Clerk of said Larimer County on the 22nd day of July, 1897, and in said statement described as follows, to-wit: The Wilson Supply Ditch, having headgate at a point on Deadman Creek which bears due north from the southeast corner of section 15 in township 10 north, of range 75 west, in said Larimer county, 750 feet, and having gate discharging water into Sand Creek at a point on the south bank thereof which bears due north from the quarter corner on the south side of sec. 9 in township 10 north, of range 75 west, in said Larimer county, 1480 feet, at which point said Sand Creek assumes a well defined channel; said ditch thence following the bed of Sand Creek to a point which bears south 53° west from the quarter corner on the west side of sec. 23, in township 11 north, of range 75 west, in said Larimer county, 370 feet, at which point is located a headgate by which the water hereby appropriated is diverted from said Sand Creek. It being the intention hereby to appropriate all of the water from Deadman Creek which naturally finds its way into the ditch herein described, and the water from the streams, valleys and natural depressions intersected by said ditch and lying above the same, and all water of Sand Creek which now reaches the headgate last above described, not heretofore appropriated. It being also the intention to divert the water herein appropriated from the water shed of the Big Laramie River into the watershed of the Cache la Poudre River.

To have and to hold, the same, together with all and singular the appurtenances and privileges thereunto belonging or in anywise thereunto appertaining, and all the estate, right, title, interest and claim whatsoever, of the said party of the first part, either in law or equity, to the only proper

use, benefit and behoof of the said party of the second part, its successors and assigns forever.

In witness whereof the said party of the first part has hereunto set his hand and seal the day and year first above written.

Rollin Q. Tenney. (Seal.)

[fol. 3084] STATE OF COLORADO,
County of Larimer, ss:

I, Charles F. Davis, notary Public in and for said County, in the State aforesaid, do hereby certify that Rollin Q. Tenney, who is personally known to me to be the person whose name is subscribed to the foregoing Deed, appeared before me this day in person, and acknowledged that he signed, sealed and delivered the said instrument of writing as his free and voluntary act, for the uses and purposes therein set forth.

Given under my hand and notarial seal, this 3" day of December, A. D. 1901.

Charles F. Davis, Notary Public. (Seal.)

My commission expires Dec. 6, 1904.

[Endorsed:] No. 71133. Quit Claim Deed. Rollin Q. Tenney to The Divide Ditch Company for Wilson Supply Ditch.

STATE OF COLORADO,
County of Larimer, ss:

I hereby certify that this instrument was filed for record in my office at 8:51 o'clock A. M., Feb. 3, 1902., and is duly recorded in Book 151, page No. 192.

J. E. Ramer, Recorder, by F. J. Burnett, Deputy.

Fees, $1.15.
B. H. Eaton, Eaton, Colo.

[fol. 3085] DEFENDANT'S EXHIBIT R-1

This deed, made this first day of May, in the year of our Lord one thousand nine hundred and two, between Rollin Q. Tenney of the County of Larimer and State of Colorado, of the first part, and Benjamin H. Eaton, of the County of Weld and State of Colorado, of the second part:

Witnesseth: That the said party of the first part, for and in consideration of the sum of Nine hundred and fifty Dollars, to the said party of the first part in hand paid by the said party of the second part, the receipt whereof is hereby confessed and acknowledged, has remised, released, sold, conveyed and quit claimed, and by these presents does remise, release, sell, convey and quit claim unto the said party of the second part, his heirs and assigns forever, all the right, title, interest, claim and demand which the said party of the first part has in and to the following described property situate, lying and being in the County of Larimer and State of Colorado, to-wit: For the right of way for that certain ditch known as the Columbine Ditch, located in Section twenty-six in Tp. 10 N. R. 75 West, with all rights to the appropriation of water and any and all interests therein.

To have and to hold the same, together with all and singular the appurtenances and privileges thereunto belonging, or in anywise thereunto appertaining, and all the estate, right, title, interest and claim whatsoever, of the said party of the first part, either in law or equity, to the only proper use, benefit and behoof of the said party of the second part, his heirs and assigns forever.

In witness whereof the said party of the first part has hereunto set his hand and seal the day and year first above written.

Rollin Q. Tenney. (Seal.)

[fol. 3085a] STATE OF COLORADO,
County of Larimer, ss:

I, Sanford Darroh, a notary public in and for said County, in the State aforesaid, do hereby certify that Rollin Q. Tenney, who is personally known to me to be the person whose name is subscribed to the foregoing Deed, appeared before me this day in person, and acknowledged that he signed, sealed and delivered the said instrument of writing as his free and voluntary act, for the uses and purposes therein set forth.

Given under my hand and notarial seal, this first day of May, A. D. 1902.

Sanford Darroh, Notary Public. (Seal.)

My commission expires 12/6, 1904.

[Endorsed:] No. 72817. Quit Claim Deed. Rollin Q. Tenney, to Benjamin H. Eaton. Columbine Ditch R. of W.

STATE OF COLORADO,
County of Larimer, ss:

I hereby certify that this instrument was filed for record in my office at 2:50 o'clock P. M., May 6, 1902, and is duly recorded in Book 151, page No. 273.

J. E. Ramer, Recorder, by F. J. Burnett, Deputy.

Fees, $——.

Filed in District Court, Larimer County, Colo. Apr. 27, 1910. Harry H. Hartman, Clerk.

[fol. 3086] DEFENDANT'S EXHIBIT S-1

This Deed, made this first day of May, in the year of our Lord one thousand nine hundred and two, between Benjamin H. Eaton, of the County of Weld and State of Colorado, of the first part, and The Divide Ditch Company, a Corporation of the State of Colorado with place of business at the town of Eaton in the County of Weld and State of Colorado, of the second part:

Witnesseth: That the said party of the first part, for and in consideration of the sum of Twenty-four Hundred Dollars to the said party of the first part in hand paid by the said party of the second part, the receipt whereof is hereby confessed and acknowledged, has remised, released, sold, conveyed and quit claimed, and by these presents does remise, release, sell, convey and quit claim unto the said party of the second part, its successors and assigns forever, all the right, title, interest, claim and demand which the said party of the first part has in and to the following described property situate, lying and being in the County of Larimer and State of Colorado, to-wit: An undivided two-thirds interest in the ditch known as "The Wilson Supply Ditch" located in Sections fifteen and sixteen in township ten (10) north range seventy-five west and Sections twenty-two and twenty-three, Township Eleven north range seventy-five west together with all appropriations of water through or by said ditch, and all improvements and work done thereon and the right of way.

To have and to hold the same, together with all and singular the appurtenances and privileges thereunto belonging, or in anywise thereunto appertaining, and all the estate,

right, title, interest and claim whatsoever, of the said party of the first part, either in law or equity, to the only proper use, benefit and behoof of the said party of the second part, its successors, and assigns forever.

In witness whereof the said party of the first part has hereunto set his hand and seal the day and year first above written.

Benjamin H. Eaton. (Seal.)

[fol. 3087] STATE OF COLORADO,
County of Larimer, ss:

I, Sanford Darroh, a Notary Public in and for said County, in the State aforesaid, do hereby certify that Benjamin H. Eaton, who is personally known to me to be the person whose name is subscribed to the foregoing Deed, appeared before me this day in person, and acknowledged that he signed, sealed and delivered the said instrument of writing as his free and voluntary act, for the uses and purposes therein set forth.

Given under my hand and notarial seal, this first day of May, A. D. 1902.

Sanford Darroh, Notary Public. (Seal.)

My Commission expires 12/6, 1904.

[Endorsed:] No. 72816. Quit Claim Deed. Benjamin H. Eaton to The Divide Ditch Company for Wilson Supply Ditch.

STATE OF COLORADO,
County of Larimer, ss:

I hereby certify that this instrument was filed for record in my office at 2:45 o'clock P. M., May 6, 1902, and is duly recorded in Book 151, page No. 272.

J. E. Ramer, Recorder, by F. J. Burnett, Deputy.

Fees, $——.

In District Court 2196. Larimer County, Colo.
Filed in District Court Larimer County, Colo., April 27, 1910. Harry H. Hartman, Clerk.

[fol. 3087a] STATE OF COLORADO,
County of Larimer, ss:

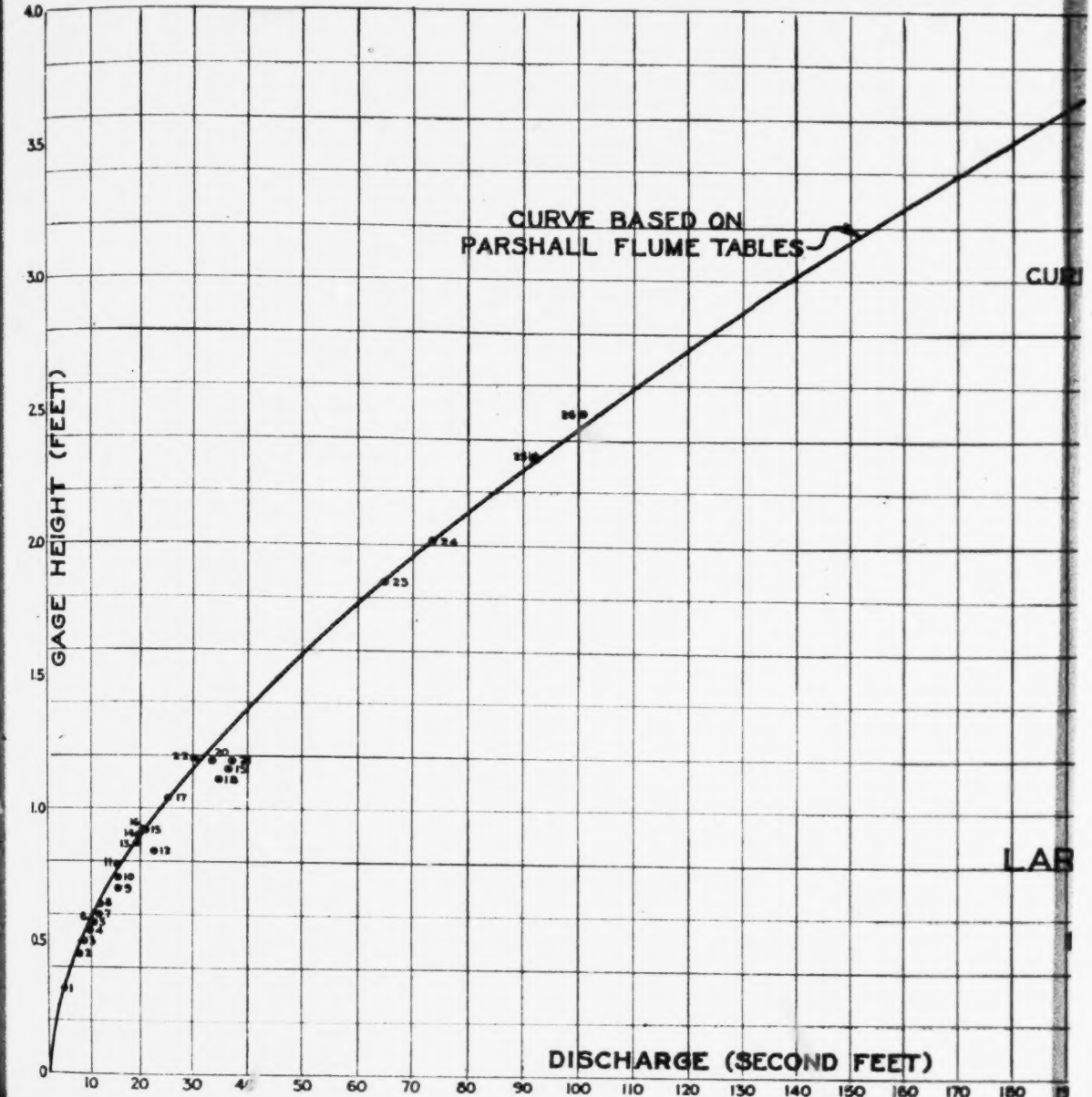
I, F. J. Burnett, Deputy, County Clerk in and for said County, in the State aforesaid, do hereby certify that the above and foregoing is a full, true and complete transcript of Quit Claim Deed, Benjamin H. Eaton to Divide Ditch Company, which was filed in this office the 6th day of May, A. D. 1902, and recorded in Book 151, on page 272, of said Larimer County Records.

In testimony whereof I have hereunto set my hand and affixed the seal of said County, at Fort Collins, this 9" day of June, 1902.

J. E. Ramer, County Clerk and ex-Officio Recorder;
F. J. Burnett, Deputy. (Seal.)

(Here follow photolithographs of Defendant's Exhibit T-1, side folio 3088)

DEFENDANT'S EXHIBIT T-1



1

CURRENT METER MEASUREMENTS

No.	Date	Gage Height	Disch. Sec. Ft.	Hydrographer
1	4-16-33	0.32	3.83	Meeker
2	8-5-30	0.45	7.28	Baily
3	5-25-27	0.50	8.33	Hinderlider
4	8-3-29	0.54	9.65	Baily
5	7-17-27	0.57	10.47	Parshall
6	10-3-28	0.58	9.85	Rohwer
7	7-4-30	0.60	11.51	Baily
8	9-22-32	0.64	11.76	Whitten
9	7-11-29	0.70	15.35	Meeker
10	7-18-29	0.74	15.36	Baily
11	6-8-30	0.79	15.25	Parshall
12	7-18-29	0.84	22.77	Baily
13	6-8-30	0.87	19.07	Parshall
14	5-5-32	0.90	15.52	Whitten
15	5-24-27	0.92	20.98	Hinderlider
16	5-24-27	0.92	20.51	Hinderlider
17	6-16-27	1.04	25.30	Rohwer
18	7-5-32	1.11	34.68	Hinderlider, Parshall & Field
19	7-5-32	1.15	36.52	Hinderlider, Parshall & Field
20	7-10-32	1.18	33.41	Parshall
21	7-5-32	1.18	37.06	Parshall
22	8-15-32	1.19	30.04	Burgess
23	6-18-32	1.86	64.82	McGraw
24	6-16-27	2.02	73.40	Rohwer
25	6-10-33	2.326	91.95	Potts
26	6-10-33	2.50	100.70	McGraw

LARAMIE-POUDRE TUNNEL

RATING CURVE

PARSHALL 6 FT. FLUME

180 190 200 210 220 230 240 250

3088

[fol. 3089] DEFENDANT'S EXHIBIT U-1

This deed, made this 15th day of February, in the year of our Lord one thousand nine hundred and four, between The Divide Ditch Co., a Corporation doing business in the Counties of Weld and Larimer, in the State of Colorado, of the first part, and The Divide Canal and Reservoir Company, a Corporation duly organized, existing and doing business in the County of Larimer and State of Colorado of the second part:

Witnesseth, that the said party of the first part, for and in consideration of the sum of One Dollar, and other valuable considerations, to it in hand paid by the party of the second part the receipt whereof is hereby confessed and acknowledged, has remised, released, sold, conveyed and quit-claimed, and by these presents does remise, release, sell, convey and quit-claim unto the said party of the second part, its successors and assigns, forever, all the right, title, interest, claim and demand which the said party of the first part has in and to the following described real estate situate, lying and being in the County of Larimer and State of Colorado, to-wit:

The following irrigation supply ditches and rights of way and appropriations thereof, taken from Deadman Creek and its branches, a tributary of the Laramie River in Larimer County, Colorado, to-wit:

The Columbine Ditch, commencing at a point on a branch of Deadman Creek about five hundred feet west of the center of Sec. 35, Tp. 10 N. R. 75 W. Thence in a Northeasterly direction, crossing another branch of said Creek and taking [fol. 1390] the water therefrom, to a point about two hundred feet east of the South ¼ corner of Sec. 26, said Tp. and Range. Thence in a Northeasterly direction to a branch of the North Fork of the Cache la Poudre River, where water is to be discharged to be carried down said Cache la Poudre River and its branches to the place of diversion; said ditch will also be extended, from, at or near said S. ¼ corner of said Sec. 26 in a Northerly direction through sections 26, 23 and 22 in said Tp. and Range, to head of Deadman Ditch at the main branch of Deadman Creek at a point 750 feet North of the South east corner of Sec. 15,

Tp. 10 N. R. 75 W. where the said Columbine Ditch discharges water into the said Deadman Ditch.

Also Deadman Ditch, also known as the Wilson Supply Ditch, and the right of way there for which is to divert water from several branches of said Deadman Creek, and extends in a Northeasterly direction from the point last mentioned through Secs. 15, 16 and 9 in Tp. 10 N. R. 75 W. being described as follows:

Commencing at the bank of Deadman Creek at a point 750 feet North of the S. E. Corner of Sec. 15 Tp. 10 N. R. 75 W. running, thence, South 65 degrees West 1,000 feet; thence North 81 degrees West 850 feet; thence South 73 degrees West 890 feet; thence North 28 degrees east 760 feet; thence North 16 degrees 30′ 900 feet; thence North 72 degrees west 1,280 feet; thence North 56 degrees 30′ west 1,150 feet; thence North 50 degrees west 1,200 feet; thence North 35 degrees west 1,550 feet; thence N. 30 degrees east 565 feet; thence North 5 degrees east 700 feet; thence North 75 degrees 30′ west 1,000 feet; thence North 69 degrees 30′ west 900 feet to a point where Sand Creek shows a well defined channel. Thence following said Sand Creek through sections 9 and 4 Tp. 10 N. R. 75 W. and through sections 33, 34, 27 and 22 Tp. 11 N. R. 75 W. where the Divide Ditch, so called, is taken from said Sand Creek, to divert the waters therefrom derrived as aforesaid.

Also the said Divide Ditch and the right of way and appropriations the same being a ditch to divert water from [fol. 3091] Sand Creek derrived from the Columbine and Deadman ditches, and otherwise, over and accross the divide between Sand Creek and Sheep Creek a tributary of the Cache la Poudre River, said ditch being described as follows:

Commencing at a point 240 feet south 22 degrees 30′ west to the ¼ corner on the east side of Sec. 22, thence S. 87 degrees E. 391 feet North 45 degrees E. 1100 feet; North 74 degrees 30′ east 390 feet; S. 84 degrees E. 600 feet; N. 58 degrees E. 650 feet to point of discharge into Sheep Creek, a tributary of the Cache la Poudre River through which said waters, diverted as aforesaid, are to be carried into the Cache la Poudre River and carried, thence to the proposed place of diversion from the Cache la Poudre River; to be used for the filling of reservoirs and for the direct irrigation of lands.

Also several storage reservoirs are to be constructed along Sand Creek aforesaid, in sections 9 and 4, Tp. 10 N. R. 75 W. and in section 33 and 4 in Tp. 11, N. R. 75 W. and at other places.

That all of said waters derived and appropriated from the tributaries of the Laramie River and from the Cache la Poudre River and its tributaries are to be diverted from said river at the head of and carried through the ditch of The North Poudre Irrigation Company, the ditch of The Poudre Valley Irrigation Company and the ditch of the Larimer and Weld Irrigation Company, respectively.

To have and to hold the same, together with all and singular the appurtenances and privileges thereunto belonging or in anywise appertaining, and all the estate, right, title, interest and claim whatsoever of the said party of the first part, either in law or equity, to the only proper use, benefit and behoof of the said party of the second part, its successors and assigns, forever.

In witness whereof, the said party of the first part has caused these presents to be signed by its president, attested by its secretary and affixed its corporate seal hereto the [fols. 3092 & 3093] day and year first above written.

The Divide Ditch Company. By Bruce G. Eaton, President. (Seal.) Attest: Ellis Smith, Secretary.

State of Colorado,
County of Weld, ss:

I, Frederick L. Weller, a Notary Public in and for the above named county, in the state aforesaid, do hereby certify that Bruce G. Eaton, president of The Divide Ditch Company, personally known to me to be the person whose name is subscribed to the foregoing Deed appeared before me this day in person and acknowledged that he signed, sealed and delivered the said instrument of writing as his free and voluntary act, and the free and voluntary act of the above named corporation for the uses and purposes therein set forth.

Given under my hand and Notarial seal this 16th day of February, A. D. 1804.

Frederick L. Weller, Notary Public. (Seal.)

My commission expires February 12th, 1906.

[fol. 3094] [Endorsed:] 82324. Quit-claim deed from the Divide Ditch Company to the Divide Canal & Reservoir Co.

STATE OF COLORADO,
County of Larimer, ss:

I hereby certify that this instrument was filed for record at 1:35 o'clock P. M. Feb. 18, 1904, in my office, and duly recorded in book 181, page No. 112.

J. E. Ramer, County Recorder. By F. J. Burnett, Deputy Recorder.

Fees $1.75 Pd., B. H. Eaton, P. O. Box 159, Eaton, Colo.

In District Court, Larimer County, Colo. 2196.
Filed in District Court, Larimer County, Colo., Apr. 27, 1910. Harry H. Hartman, Clerk.

(Here follow photolithographs of Defendant's Exhibits V-1 and W-1, side folios 3095 and 3096)

DEFENDANT'S EXHIBIT V-1 1524A

WMGH 2.326

STATE OF COLORADO
ENGINEERING DEPARTMENT
CURRENT METER NOTES

DATE 6-10 1933 TIME BEGIN 12:06 PM END 12:43 "

DIV. 1 DIST. 3

LARAMIE POURRE RIVER, AT TUNNEL OUTLET

GAGE HT. BEGINNING ..... FT. ENDING ..... FT. MEAN ..... FT. METER NO. 3323

MEAS. POTTS NOTES BY C.E. McGRAW

Dist. from initial point	Depth	Depth of observat.	Revolutions	Time in seconds	VELOCITY At point	VELOCITY Mean in vertical	VELOCITY Mean in section	Area	Mean Depth	Width	Discharge
.11	2.25	.2	50	40	2.84	2.24					
		12:10 .8	30	42	1.64		1.88	2.61	2.35	1.11	4.91
1	2.45	.2	40	44	2.07	1.52					
		12:11 .8	20	48	0.97		2.31	2.43	2.43	1	5.61
2	2.40	.2	60	44	3.10	3.09					
	12:15 PM	.8	40	43.5	2.08		3.20	2.45	2.45	1	7.84
3	2.50	.2	80	44	4.12	3.31					
	12:20	.8	50	45.5	2.50		3.89	2.50	2.50	1	9.72
4	2.50	.2	70	40	3.97	4.47					
	12:27	.8	90	41	4.97		4.85	2.50	2.50	1	12.12
5	2.50	.2	100	43	5.26	5.23					
	12:27	.8	100	43.5	5.20		5.24	2.50	2.50	1	13.10
6	2.50	.2	100	41.5	5.45	5.24					
	12:30	.8	90	40.5	5.03		4.98	2.50	2.50	1	12.45
7	2.50	.2	100	42.5	5.32	4.72					
	12:35	.8	80	44	4.12		4.65	2.52	2.52	1	11.72
8	2.55	.2	90	40.5	5.03	4.58					
	12:38	.8	80	42	4.32		4.64	3.12	2.58	1.21	14.48
9	2.60	.2	90	42.5	4.80	4.71					
	12:42	.8	90	44	4.63						
											91.95
9											
Totals											

Dfdt's Ex. V-1

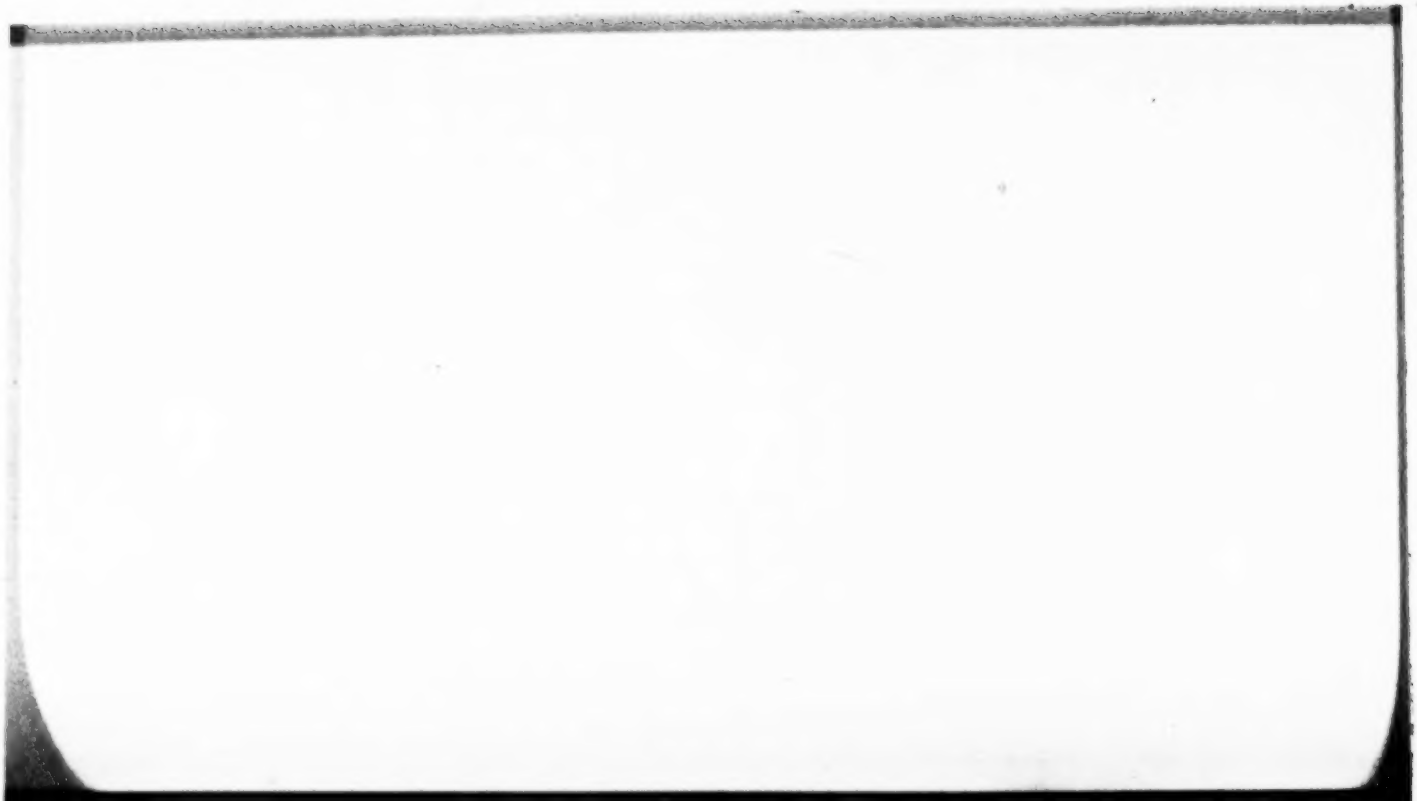
NVT

GH (6' Flume) 2.326 = 92.25 S.F.

.34 %

PLACE NOTES ON BACK OF SHEET

3095



DEFENDANT'S EXHIBIT W-1

W.M.G.H. - 2.497 FT.

STATE OF COLORADO
ENGINEERING DEPARTMENT

DATE 6-10-33 19.... **CURRENT METER NOTES** TIME { BEGIN 12 55 PM / END 1:31 PM

DIV. 1 DIST. 3

LARAMIE POUDRE RIVER, AT TUNNEL OUTLET

GAGE HT. BEGINNING ..... FT. ENDING ..... FT. MEAN ..... FT. METER NO. 13

MEAS. McGRAW NOTES BY P.O.H.S.

Dist. from initial point	Depth	Depth of observat.	Revolutions	Time in seconds	Velocity: At point	Velocity: Mean in vertical	Velocity: Mean in section	Area	Mean Depth	Width	Discharge
.08	2.55	1.02 M.	80	47½	3.75	3.24					
			60	49½	2.73						
1	2.62	1.02 PM	80	53	3.27	2.94	3.09	2.79	2.58	1.08	8.62
			50	45	2.50						
2	2.63	1.02 PM	80	48½	3.68	4.25	3.60	2.62		1	9.43
			100	46	4.82						
3	2.64	1.00 PM	90	45	4.44	4.68	4.46	2.64		1	11.77
			100	45	4.92						
4	2.63	1.13 PM	100	42	5.27	5.18	4.93	2.64		1	13.02
			100	43½	5.09						
5	2.66	1.23 PM	100	41	5.40	5.22	5.20	2.64		1	13.73
			100	44	5.03						
6	2.67	1.21 PM	100	41	5.40	5.06	5.14	2.66		1	13.67
			100	47	4.72						
7	2.74	[illegible] PM	100	43	5.15	5.04	5.05	2.70		1	13.64
			100	45	4.92						
8½	2.74	[illegible]	100	44	5.03	4.94	4.99	3.37	2.74	1.23	16.82
			100	43½	4.86						
9.92											

COMPUTED Q FROM TABLE

GIVES 103.50 C.F.S.

D.P.H.S. Ex. W. 1

JMT

100.70

PLACE NOTES ON BACK OF SHEET

[fol. 3097] DEFENDANT'S EXHIBIT X-1

Warranty Deed

This Indenture, made this third day of February, in the year of our Lord one thousand nine hundred and six, between Peter Cunningham and Minerva Cunningham, his wife, of the County of Albany, and State of Wyoming, of the first part, and James M. Hoge, of the County of Albany, and State of Wyoming, of the second part:

Witnesseth: That the said parties of the first part, for and in consideration of the sum of Seven Thousand Dollars, to the said parties of the first part in hand paid by the said party of the second part, the receipt whereof is hereby confessed and acknowledged, have granted, bargained, sold and conveyed, and by these presents do grant, bargain, sell, convey and confirm unto the said party of the second part, his heirs and assigns forever, all the following described lots or parcels of land, situate, lying and being in the County of Albany, and State of Wyoming, to-wit:

All of Section Twenty-six (26) and the northeast quarter of Section Twenty-four (24); Township fourteen (14), Range Seventy-five (75); together with all the improvements and appurtenances, including among other things all fences, water rights and ditches situated upon or used in connection with said lands or any of them; also all the right, title and interest in and to the certain irrigation ditch known as the Le Roy Ditch, hereby waiving and releasing any and all rights under and by virtue of the homestead exemption laws of the State of Wyoming.

To have and to hold the same, together with all and singular the appurtenances and privileges thereunto belonging, or in anywise thereunto appertaining, including the release and waiver of the right of homestead, and all the estate, right, title, interest and claim whatsoever of the said parties of the first part, either in law or equity, to the only proper use, benefit and behoof of the said party of the second part, his heirs, and assigns forever.

And the said parties of the first part, for themselves, their heirs, executors and administrators, do covenant and agree to and with the said party of the second part, his heirs and assigns, that at the ensealing and delivery of these presents

they are well seized of the said granted premises, in and of a good and indefeasible estate in fee simple.

And that they have good and lawful right to sell and convey the same, and that they will warrant and defend the same against all lawful claims and demands whatsoever.

And for the consideration aforesaid, I, the said Minerva Cunningham, wife of the said Peter Cunningham, do hereby relinquish and release unto the said party of the second part, his heirs and assigns forever, all my rights, and including the release and waiver of the right of homestead, and all of my rights whatsoever, of, in and to the aforegranted premises.

In witness whereof, the said parties of the first part have hereunto set their hands and seals the day and year first above written.

Peter Cunningham (Seal.) Minerva Cunningham (Seal.)

Signed, sealed and delivered in presence of Will McMurray.

THE STATE OF WYOMING,
County of Albany, ss:

I, R. G. Fitch, a Notary Public in and for the said County, in the State aforesaid, do hereby certify that Peter Cunningham and Minerva Cunningham, his wife, personally known to me to be the same persons whose names are subscribed to the foregoing instrument, appeared before me this day in person, and acknowledged that they signed, sealed and delivered the said instrument as their free and voluntary act, for the uses and purposes therein set forth, including the release and waiver of all rights of homestead in and to the property therein described.

And I further certify that Minerva Cunningham, wife of the said Peter Cunningham, while separate and apart from her said husband, was by me fully apprised of her right and the effect of signing and acknowledging said instrument, the contents and nature of which were explained to her by me, and thereupon, while so separate and apart from her said husband, and out of his hearing, she signed and acknowledged said instrument, and acknowledged to me that she released and waived her right of homestead in and to said property, and also signed and acknowledged said in-

strument freely and voluntarily, for the uses and purposes therein set forth.

My commission expires Sept. 20, 1906.

Given under my hand and notarial seal this 6th day of February, A. D. 1906.

R. G. Fitch, Notary Public. (Seal.)

[Endorsed:] 47441. Warranty Deed. Peter Cunningham et al. to James M. Hoge.

STATE OF WYOMING,
County of Albany, ss:

This deed was filed for record at 11:55 o'clock in the forenoon, on the 7 day of May, A. D. 1909, and duly recorded in Book R-1 of Deeds, on page 245.

B. Featherstone, County Clerk and ex-officio Register of Deeds.

No. ——
Fees, $2.00.

Indexed. Examined. Abstracted. In District Court, Larimer County, Colo. 2196.

Filed in District Court, Larimer County, Colo., Apr. 27, 1910. Harry H. Hartman, Clerk.

[fol. 3098] DEFENDANT'S EXHIBIT Y-1

Warranty Deed.

This indenture, made this third day of February, in the year of our Lord one thousand nine hundred and six, between James M. Hoge, of the County of Albany, and State of Wyoming, of the first part, and Bruce G. Eaton, of the County of Weld, and State of Colorado, of the second part:

Witnesseth: That the said party of the first part, for and in consideration of the sum of seven thousand dollars, to the said party of the first part in hand paid by the said party of the second part, the receipt whereof is hereby confessed and acknowledged, has granted, bargained, sold and conveyed, and by these presents does grant, bargain, sell, convey and confirm unto the said party of the second part,

his heirs and assigns forever, all the following described lots or parcels of land, situate, lying and being in the County of Albany, and State of Wyoming, to-wit:

All of Section twenty six (26) and the northeast quarter of Section twenty four (24) in township fourteen (14) north, of range seventy five (75) west.

Together with all the improvements and appurtenances including, among other things, all fences, water rights and ditches situated upon or used in connection with said lands or any of them, also all the right title and interest of the party of the first part in and to the certain irrigating ditch known as the LeRoy Ditch.

To have and to hold the same, together with all and singular the appur-enances and privileges thereunto belonging, or in anywise thereunto appertaining, including the release and waiver of the right of homestead, and all the estate, right, title, interest and claim whatsoever of the said party of the first part, either in law or equity, to the only proper use, benefit and behoof of the said party of the second part, his heirs and assigns forever.

And the said party of the first part, for himself, his heirs, executors and administrators, doth covenant and agree, to and with the said party of the second part, his heirs and assigns, that he will warrant and defend the same against all lawful claims and demands whatsoever of all persons claiming or to claim the same by, through or under the party of the first part.

In witness whereof the said party of the first part has hereunto set his hand and seal the day and year first above written.

James M. Hoge. (Seal.)

Signed, sealed and delivered in presence of N. E. Corthell.

THE STATE OF WYOMING,
County of Albany, ss:

I, Nellis Corthell, a Notary Public in and for the said County, in the State aforesaid, do hereby certify that James M. Hoge, who is personally known to me to be the same person whose name is subscribed to the foregoing instrument, appeared before me this day in person, and acknowledged that he signed, sealed and delivered the said instrument as his free and voluntary act, for the uses and purposes

therein set forth, including the release and waiver of his rights of homestead in and to the property therein described.

Given under my hand and notarial seal this 4th day of April, A. D. 1906.

Nellis Corthell, Notary Public. (Seal.)

My commission expires Nov. 13, 1907.

[Endorsed:] 47442. Warranty Deed. James M. Hoge to Bruce G. Eaton.

STATE OF WYOMING,
County of Albany, ss:

This Deed was filed for record at 11:55 o'clock in the forenoon, on the 7 day of May, A. D. 1909, and duly recorded in Book R-1 of Deeds on page 246.

B. Featherstone, County Clerk and ex-officio Register of Deeds.

No. ——.
Fees, $2.00.

Indexed. Examined. Abstracted.

In District Court, Larimer County, Colo. 2196.
Filed in District Court, Larimer County, Colo., Apr. 27, 1910. Harry H. Hartman, Clerk.

[fol. 3099] DEFENDANT'S EXHIBIT Z-1

Warranty Deed

This indenture, made this thirtieth day of March, in the year of our Lord one thousand nine hundred and six, between James Hardman and Alice Hardman, his wife, of the County of Albany, and State of Wyoming, of the first part and Bruce G. Eaton, of the County of Weld, and State of Colorado, of the second part:

Witnessth: That the said parties of the first part, for and in consideration of the sum of eight thousand five hundred dollars, to the said parties of the first part in hand paid by the said party of the second part, the receipt whereof is hereby confessed and acknowledged, have

granted, bargained, sold and conveyed, and by these presents do grant, bargain, sell, convey and confirm unto the said party of the second part, his heirs and assigns forever, all the following described lots or parcels of land, situate, lying and being in the County of Albany, and State of Wyoming, to-wit:

The West half; and the West half of the East half of Section two (2); and all that portion of the North half of Section Eleven (11) bounded and described as follows: Beginning at a point in the County road, 3.14 chains west of the North East corner of said Section 11, and running thence along said road, South, 54° 30′ West. 36.40 chains; thence, along said county road, South 68° 30′ West, 15.56 chains; thence, along said county road, North, 62° West, 4.80 chains; thence, North 22° East, 7.95 chains, to a point of the west side of Sand Creek; thence, North 88° West, 30.60 chains, to a point on the west line of said Section 11; thence north, on the west line of said Section 11, 17.10 chains, to the northwest corner thereof; thence South 89° 30′ East, on the north line of said Section 11, 76.86 chains, to the place of beginning, subject to the right reserved in the deed of said James and Emma King for said lands in Section 11, in case Sand Creek should change its channel by washing or otherwise, so that said Kings or their heirs should be deprived of sufficient water within the boundaries of the lands reserved by said Kings in said Section 11, to have egress and ingress to said Sand Creek, within the boundaries of the land above described in Section 11 for the purpose of watering all stock of said Kings, in which event said Kings are to pay for a lane leading to Sand Creek, at the same price per acre that was paid by said Alice Hardman to the said Kings for the lands above described in said Section 11.

All of said lands situate lying and being in Township thirteen (13) north, of range seventy-five (75) west of the Sixth Principal Meridian.

Also, all buildings and improvements situated upon said lands and all water rights connected with the same or with the general ranch premises of the parties of the first part, also all fencing and enclosures connected with said general ranch premises, and including among other things the following ditches and the water rights belonging to the same, towit: the James Hardman No. 2 Ditch, the James Hard-

man No. 1 Ditch, the undivided interests of James and Alice Hardman in the Davis Brothers No. 1 Ditch and in the Davis Brothers No. 2 Ditch. Hereby releasing and waiving any and all rights under and by virtue of the homestead exemption laws of the State of Wyoming.

To have and to hold the same, together with all and singular the appurtenances and privileges thereunto belonging, or in anywise thereunto appertaining, including the release and waiver of the right of homestead, and all the estate, right, title, interest and claim whatsoever of the said parties of the first part, either in law or equity, to the only proper use, benefit and behoof of the said party of the second part, his heirs and assigns forever.

And the said parties of the first part, for themselves, their heirs, executors and administrators, do covenant and agree, to and with the said party of the second part, his heirs and assigns, that at the ensealing and delivery of these presents they are well seized of the said granted premises, in and of a good and indefeasible estate in fee simple.

And that they have good and lawful right to sell and convey the same, and that they will warrant and defend the same against all lawful claims and demands whatsoever.

And for the consideration aforesaid, I, the said Alice Hardman, wife of the said James Hardman, do hereby relinquish and release unto the said party of the second part, his heirs and assigns forever, all my rights, and including the release and waiver of the right of Homestead, and all of my rights whatsoever, of, in and to the aforegranted premises.

In witness whereof the said parties of the first part have hereunto set their hands and seals the day and year first above written.

James Hardman. (Seal.) Alice Hardman. (Seal.)

Signed, sealed and delivered in presence of
N. E. Corthell.

The State of Wyoming,
County of Albany, ss:

I, Nellis Corthell, a Notary Public in and for the said County, in the State aforesaid, do hereby certify that

James Hardman and Alice Hardman, who are personally known to me to be the same persons whose names are subscribed to the foregoing instrument, appeared before me this day in person, and acknowledged that they signed, sealed and delivered the said instrument as their free and voluntary act, for the uses and purposes therein set forth, including the release and waiver of their rights of homestead in and to the property therein described.

And I further certify that Alice Hardman, wife of the said James Hardman, while separate and apart from her said husband, was by me fully apprised of her right and the effect of signing and acknowledging said instrument, the contents and nature of which were explained to her by me, and thereupon, while so separate and apart from her said husband, and out of his hearing, she signed and acknowledged said instrument, and acknowledged to me that she released and waived her right of homestead in and to said property, and also signed and acknowledged said instrument freely and voluntarily, for the uses and purposes therein set forth.

Given under my hand and notarial seal this 24 day of April, A. D. 1906.

Nellis Corthell, Notary Public. (Seal.)

My commission expires Nov. 13, 1907.

[Endorsed:] 47440. Warranty Deed. James Hardman and Alice Hardman to Bruce G. Eaton.

STATE OF WYOMING,
County of Albany, ss:

This deed was filed for record at 11:55 o'clock in the forenoon, on the 7 day of May, A. D. 1909, and duly recorded in Book R-1 of Deeds, on page 244.

B. Featherstone, County Clerk and ex-officio Register of Deeds. —— ——, Deputy.

No. ——.
Fees, $2.00.

Indexed. Examined. Abstracted.

In District Court, Larimer County, Colo. 2196.

Filed in District Court, Larimer County, Colo., Apr. 27, 1910. Harry H. Hartman, Clerk.

[fol. 3100] DEFENDANT'S EXHIBIT A-2

Warranty Deed

This indenture, made this twenty-fourth day of November, in the year of our Lord one thousand nine hundred and six, between Bruce G. Eaton of the County of Weld, and State of Colorado, of the first part, and Lemuel E. Cook, of the County of Albany, and State of Wyoming, of the second part:

Witnesseth: That the said party of the first part, for and in consideration of the sum of One Thousand Dollars to the said party of the first part in hand paid by the said party of the second part, the receipt whereof is hereby confessed and acknowledged, has granted, bargained, sold and conveyed, and by these presents does grant, bargain, sell, convey and confirm unto the said party of the second part, his heirs and assigns forever all the following described lot or parcel of land, situate, lying and being in the County of Albany, and State of Wyoming, to-wit:

The northeast quarter of Section Twenty-four (24) in Township Fourteen (14) North, of Range Seventy-five (75) of the Sixth Principal Meridian. Together with all the improvements and appurtenances. Excepting and reserving, however, unto the party of the first part, his heirs and assigns, any and all water rights belonging to the party of the first part and heretofore connected with said lands or any part thereof.

[fol. 3101] To have and to hold the same, together with all and singular the appurtenances and privileges thereunto belonging, or in anywise thereunto appertaining, including the release and waiver of the right of homestead, and all the estate, right, title, interest and claim whatsoever of the said party of the first part, either in law or equity, to the only proper use, benefit and behoof of the said party of the second part, his heirs and assigns forever.

And the said party of the first party, for himself, his heirs, executors, and administrators, does covenant and agree, to and with the said party of the second part, his heirs and assigns, that at the ensealing and delivery of these presents he is well seized of the said granted premises, in and of a good and indefeasible estate in fee simple.

And that he has good and lawful right to sell and convey the same, and that he will warrant and defend the same against all lawful claims and demands whatsoever.

In witness whereof the said party of the first part has hereunto set his hand and seal the day and year first above written.

Bruce G. Eaton. (Seal.)

Signed, sealed and delivered in presence of C. J. Stockfleth.

[fol. 3102] THE STATE OF COLORADO,
County of Weld, ss:

I, Clarence W. Candlin, a Notary Public in and for the said County, in the State aforesaid, do hereby certify that Bruce G. Eaton, who is personally known to me to be the same person whose name he subscribed to the foregoing instrument appeared before me this day in person, and acknowledged that *is* signed, sealed and delivered the said instrument as his free and voluntary act and deed, for the uses and purposes therein set forth, including the release and waiver of his rights of homestead in and to the property therein described.

And I further certify that wife of the said —— ——, while separate and apart from her said husband, was by me fully apprised of her right and the effect of signing and acknowledging said instrument, the contents and nature of which were explained to her by me, and thereupon, while so separate and apart from her said husband, and out of his hearing, she signed and acknowledged said instrument, and acknowledged to me that she released and waived her right of homestead in and to said property, and also signed and acknowledged said instrument freely and voluntarily, for the uses and purposes therein set forth.

Given under my hand and notarial seal this 6th day of December, A. D. 1906.

Clarence W. Candlin, Notary Public. (Notarial Seal.)

My commission expires March 11, 1909.

[fol. 3103] STATE OF WYOMING,
County of Albany, ss:

I, A. H. Michelson, County Clerk and Ex-officio Register of Deeds within and for said County and State aforesaid,

do hereby certify that the foregoing is a full, true and correct copy of the Warranty Deed from Bruce G. Eaton to Lemuel E. Cook, as the same was filed in this office at 3:00 o'clock P. M. on the 29th day of November, A. D. 1909, being instrument No. 48746, and recorded in Book R-1, page 283.

In testimony whereof I have hereunto subscribed my hand and affixed the official seal of said County at Laramie, this second day of November, A. D. 1929.

A. H. Micholson, County Clerk and Ex-officio Register of Deeds, by E. Rauner, Deputy. (Seal.)

[fol. 3104] [Endorsed:] Warranty Deed. Bruce G. Eaton to Lemuel E. Cook. N. E. 24-14-75. Reserve all water rights.

THE STATE OF WYOMING,
County of Albany, ss:

This deed was filed for record at — o'clock in the — noon, on the 29th day of November, A. D. 1909, and duly recorded in Book R-1 of Deeds, on page 283.

—— ——, County Clerk and Ex-officio Register of Deeds; —— ——, Deputy.

No. ——
Fees, $——.

[fol. 3105] DEFENDANT'S EXHIBIT B-2

Warranty Deed

This indenture, made this twentieth day of December, in the year of our Lord one thousand nine hundred and seven, between Bruce G. Eaton and Mary H. Eaton, his wife, of the County of Weld, and State of Colorado of the first part, and Franklin P. Mason, of the County of Albany, and State of Wyoming of the second part:

Witnesseth: That the said parties of the first part, for and in consideration of the sum of Four Thousand Dollars, to the said parties of the first part in hand paid by the said party of the second part, the receipt whereof is hereby confessed and acknowledged, have granted, bargained, sold

and conveyed, and by these presents do grant, bargain, sell, convey and confirm unto the said party of the second part, his heirs and assigns forever, all the following described lots or parcels of land, situate, lying and being in the County of Albany, and State of Wyoming, to-wit:

The west half, and the west half of the east half of Section Two (2), and all that portion of the north half of Section Eleven (11) bounded and described as follows: Beginning at a point in the County Road 3.14 chains west of the northeast corner of said section eleven (11) and running thence along said road south 54° 30′ west 36.40 chains; thence along said county road south 68° 30′ west 15.56 chains; thence along said county road north 62° west 4.80 chains; thence north 22° east 7.95 chains to a point on the west side of Sand Creek; thence north 88° west 30.60 chains to a point on the west line of said Section Eleven (11); thence north on the west line of said Section Eleven 17.10 chains to the northwest corner thereof; thence south 89° 30′ east on the north line of said Section Eleven (11) 76.86 chains to the place of beginning. Subject to the right reserved in deed of James and Emma King for said lands in said Section Eleven (11) in case said creek should change its channel by washing or otherwise, so that said Kings or their heirs or assigns should be deprived of sufficient water within the boundaries of the lands reserved by said Kings in said Section Eleven (11) to have egress and ingress to said Sand Creek within the boundaries of the land above described in Section Eleven (11) for the purpose of watering all the stock of said Kings, in which event said Kings [fol. 3106] are to pay for lane leading to Sand Creek at the same price per acre that was heretofore paid by Alice Hardman to the said Kings for the lands above described in said Section Eleven (11). All of said lands situate, lying and being in Township Thirteen (13) North of Range Seventy-five West of the Sixth Principal Meridian. Together with all improvements and appurtenances, including all water rights from Spring Creek, but reserving unto the parties of the first part, their heirs and assigns, any and all other water rights belonging to the parties of the first part heretofore connected with said lands or any part thereof. Hereby waiving and releasing any and all rights under and by virtue of the homestead exemption laws of this State of Wyoming.

To have and to hold the same, together with all and singular the appurtenances and privileges thereunto belonging, or in anywise thereunto appertaining, including the release and waiver of the right of homestead, and all the estate, right, title, interest and claim whatsoever of the said party of the first part, either in law or equity, to the only proper use, benefit and behoof of the said party of the second part, his heirs and assigns forever.

And the said party of the first part, for themselves, their heirs, executors, and administrators, do covenant and agree, to and with the said party of the second part, his heirs and assigns, that at the ensealing and delivery of these presents they are well seized of the said granted premises, in and of a good and indefeasible estate in fee simple.

And that they have good and lawful right to sell and convey the same, and that they will warrant and defend the same against all lawful claims and demands whatsoever.

And for the consideration aforesaid, I, the said Mary H. Eaton, wife of the said Bruce G. Eaton, do hereby relinquish and release unto the said party of the second part, and assigns forever, all my Rights, and including the release and waiver of the right of Homestead, and all of my rights whatsoever, of, in and to the aforegranted premises.

In Witness Whereof, The said parties of the first part have hereunto set their hands and seals the day and year first above written.

Bruce G. Eaton. (Seal.) Mary H. Eaton. (Seal.)

Signed, sealed and delivered in presence of C. M. Stockover, A. J. Allen.

[fol. 3107] The State of Colorado,
County of Weld, ss:

I, —— ——, a Notary Public in and for the said County, in the State aforesaid, do hereby certify that Bruce G. Eaton and Mary H. Eaton, his wife, who are personally known to me to be the same persons whose names are subscribed to the foregoing instrument appeared before me this day in person, and acknowledged that they signed, sealed and delivered the said instrument as their free and voluntary act and deed, for the uses and purposes therein set forth, including the release and waiver of all rights of homestead in and to the property therein described.

And I further certify that Mary H. Eaton, wife of the said Bruce G. Eaton, while separate and apart from her said husband, was by me fully apprised of her right and the effect of signing and acknowledging said instrument, the contents and nature of which were explained to her by me, and thereupon, while so separate and apart from her said husband; and out of his hearing, she signed and acknowledged said instrument, and acknowledged to me that she released and waived her right of homestead in and to said property, and also signed and acknowledged said instrument freely and voluntarily, for the uses and purposes therein set forth.

Given under my hand and notarial seal this 6th day of January, A. D. 1908.

Albert J. Allen, Notary Public. (Notarial Seal.)

My commission expires July 2d, 1910.

[fol. 3108] STATE OF WYOMING,
County of Albany, ss:

I, A. H. Michelsen, County Clerk and Ex-officio Register of Deeds within and for said County and State aforesaid, do hereby certify that the foregoing is a full, true and correct copy of the Warranty Deed from Bruce G. and Mary H. Eaton to Franklin P. Mason, as the same was filed in this office at 3:45 o'clock P. M. on the 10th day of January, A. D. 1908, being instrument No. ——, and recorded in Book R-1, page 154.

In testimony whereof I have hereunto subscribed my hand and affixed the official seal of said County at Laramie, this 2d day of November, A. D. 1929.

A. H. Michelsen, County Clerk and Ex-officio Register of Deeds, by E. Ranner, Deputy. (Seal.)

[fol. 3109] [Endorsed:] Warranty Deed. Bruce G. Eaton and Mary H. Eaton to Franklin P. Mason. W½ and A½ of E½ and part of 11, all 13—75 Range. All Water Reserved.

THE STATE OF WYOMING,
County of Albany, ss:

This deed was filed for record at —— o'clock in the — noon, on the 10th day of January, A. D. 1908, and duly recorded in Book R-1 of Deeds, on page 154.

—— ——, County Clerk and Ex Officio Register of Deeds; —— ——, Deputy.

No. ——.
Fees, $ ——.

[fol. 3110] DEFENDANT'S EXHIBIT C-2

Warranty Deed

This indenture, made this tenth day of April, in the year of our Lord one Thousand nine hundred and seven, between Bruce G. Eaton, of the County of Weld, and State of Colorado of the first part, and James M. Hoge, of the County of Albany, and State of Wyoming of the second part:

Witnesseth: That the said party of the first part, for and in consideration of the sum of ($2560.00) Twenty-five hundred sixty & 00/100 Dollars, to the said party of the first part in hand paid by the said party of the second part, the receipt whereof is hereby confessed and acknowledged, has granted, bargained, sold and conveyed, and by these presents does grant, bargain, sell, convey and confirm unto the said party of the second part, his heirs and assigns forever all the following described lots or parcels of land, situate, lying and being in the County of Albany, and State of Wyoming, to-wit:

All of Section Twenty-six (26) in Township Fourteen (14) North of Range Seventy-five (75) West of the Sixth Principal Meridian. Together with all the improvements and appurtenances including, among other things, all fences and ditches situated upon or used in connection with said lands, or any of them, and especially all the right, title and interest of the party of the first part in and to the certain irrigating ditch known as the LeRoy Ditch. Excepting and reserving, however, unto the party of the first part, his heirs, and assigns, any and all water rights belonging to

the party of the first part and heretofore connected with said lands or any part thereof.

[fol. 3111] To have and to hold the same, together with all and singular the appurtenances and privileges thereunto belonging, or in in anywise thereunto appertaining, including the release and waiver of the right of homestead, and all the estate, right, title, interest and claim whatsoever of the said party of the first part, either in law or equity, to the only proper use, benefit and behoof of the said party of the second part, his heirs and assigns forever.

And the said party of the first part, for himself, his heirs, executors, and administrators, doth covenant and agree, to and with the said party of the second part, his heirs and assigns, that at the ensealing and delivery of these presents he is well seized of the said granted premises, in and of a good and indefeasible estate in fee simple.

And that he has good and lawful right to sell and convey the same, and that he will warrant and defend the same against all lawful claims and demands whatsoever, save only the taxes for 1907 which the party of the second part assumes and agrees to pay.

In witness whereof the said party of the first part has hereunto set his hand and seal the day and year first above written.

Bruce G. Eaton, (Seal.)

Signed, sealed and delivered in presence of Clarence W. Candlin.

[fol. 3112] The State of Colorado,
County of Weld, ss:

I, Clarence W. Candlin, a Notary Public in and for the said County, in the State aforesaid, do hereby certify that Bruce G. Eaton, who is personally known to me to be the same person whose name is subscribed to the foregoing instrument appeared before me this day in person, and acknowledged that he signed, sealed and delivered the said instrument as his free and voluntary act and deed, for the uses and purposes therein set forth, including the release and waiver of his rights of homestead in and to the property therein described.

And I further certify that —— ——, wife of the said —— ——, while separate and apart from her said husband,

was by me fully apprised of her right and the effect of signing and acknowledging said instrument, the contents and nature of which were explained to her by me, and thereupon, while so separate and apart from her said husband, and out of his hearing, she signed and acknowledged said instrument, and acknowledged to me that she released and waived her right of homestead in and to said property, and also signed and acknowledged said instrument freely and voluntarily, for the uses and purposes therein set forth.

Given under my hand and notarial seal this 16th day of April, A. D. 1907.

Clarence W. Candlin, Notary Public. (Notarial Seal.)

My commission expires March 11, 1909.

[fol. 3113] STATE OF WYOMING,
County of Albany, ss:

I, A. H. Michelsen, County Clerk and Ex-officio Register of Deeds within and for said County and State aforesaid, do hereby certify that the foregoing is a full, true and correct copy of the Warranty Deed from Bruce G. Eaton to James M. Hoge, as the same was filed in this office at 4:00 o'clock p. m. on the 22d day of June, A. D. 1907, being instrument No. 44060, and recorded in Book R-1, page 123.

In testimony whereof I have hereunto subscribed my hand and affixed the official seal of said County at Laramie, this 2nd day of November, A. D. 1929.

A. H. Michelsen, County Clerk and Ex-officio Register of Deeds, by E. Ranner, Deputy. (Seal.)

[fol. 3114] [Endorsed:] Warranty Deed. Bruce G. Eaton to James M. Hodge. All 26-14-75. Reserves water right.

THE STATE OF WYOMING,
County of Albany, ss:

This deed was filed for record at — o'clock in the — noon, on the 22nd day of June, A. D., 1907, and duly recorded in Book R-1 of Deeds, on page 124. ——— ———, County Clerk and Ex Officio Register of Deeds. ——— ———, Deputy.

No. ——.

Fees, $——.

[fol. 3115] DEFENDANT'S EXHIBIT D-2

Deed

This Indenture, made this second day of January, A. D. 1920, by and between Bruce G. Eaton and Martha L. Eaton, his wife, of the first part, and The Divide Canal and Reservoir Company, a corporation, of the second part, all of Weld county, State of Colorado;

Witnesseth: That the said parties of the first part for and in consideration of the sum of one dollar and other good and valuable considerations, to them in hand paid, by the said party of the second part, the receipt whereof is hereby confessed and acknowledged, have granted, bargained, sold and conveyed, and by these presents do grant, bargain, sell, convey and confirm, unto the said party of the second part, its successors and assigns, forever, all the following described ditches and interests in ditches, and water rights and appropriations of water pertaining thereto, situate, lying, and being in the county of Albany, in the state of Wyoming, to-wit:

All the right, title and interest of the parties of the first part in and to the following irrigation ditches, taking waters out of Sand Creek and its tributaries, in the said county, and also in the appropriations of water therefor, as follows, viz:

The interests of first parties in and to that certain irrigation ditch known as the Le Roy Ditch and the appropriations of water allowed and decreed thereto, under the name of Peter Cunningham, as of the date of May, 1885, in the amount of 8.65 cubic feet of water per second of time, and which by mesne conveyances, has vested in parties of the first part.

Also the interests of the parties of the first part in and to that certain irrigation ditch known as The James Hard-
[fol. 3116] man No. 2 Ditch and the appropriations of water allowed and decreed thereto under the name of James Hardman as of the date of May, 1878, in the amount of 1.81 cubic feet of water, per second of time, and which by mesne conveyances has vested in the parties of the first part.

Also the interests of the parties of the first part in and to that certain irrigation ditch known as Davis Brothers No. 2 and Alice Hardman Ditch, and its Enlargements, and the appropriations of water allowed and decreed thereto, under the name of Alice Hardman as of the date of August 8, 1891, in the amount of 4.57 cubic feet of water per second of time, and which by mesne conveyances has vested in the parties of the first part.

Also the interests of the parties of the first part in and to that certain irrigation ditch known as Davis Brothers Sand Creek No. 2 Ditch, and its Enlargements, and the appropriations of water allowed and decreed thereto, under the name of Alice Hardman, as of the date of November 26, 1894, in the amount of 1.79 cubic feet of water per second of time, and which by mesne conveyances has vested in the parties of the first part.

The parties of the first party hereby intend to convey and do hereby convey all their rights, title, and interests, in and to the Le Roy Ditch and its appropriations of water conveyed to Bruce G. Eaton by James M. Hoge by deed dated February 3, 1906, and recorded in the office of the county clerk of Albany county, state of Wyoming, May 7, 1909, in book R-1 of deeds, at page 246; also the parties of the first part hereby intend to convey and do hereby convey all their rights, title, and interests in and to the James Hardman No. 2 Ditch, The James Hardman No. 1 Ditch, The Davis Brothers No. 1 Ditch and The Davis Brothers No. 2 Ditch, and all of the appropriations of water therefor, which are mentioned and described, and thereby in- [fol. 3117] tended to be conveyed, and were conveyed to them in that certain deed from James Hardman and Alice Hardman to Bruce G. Eaton, dated March 30, 1906, and recorded in the office of the county clerk of Albany county, in the state of Wyoming, on May 7, 1909, in book R-1 of deeds, at page 244.

To have and to hold the same together with all and singular the appurtenances and the privileges thereunto belonging, or in anywise appertaining, and all the estate, right, title, claim and interest whatsoever of the said parties of the first part, therein or thereto, either in law or in equity, to the only proper use, benefit and behoof of the said party of the second part, its successors and assigns forever.

And for the considerations aforesaid, I, the said Martha L. Eaton, wife of the said Bruce G. Eaton, do hereby relinquish and release unto the said party of the second part, its successors and assigns forever, all my rights, and including the release and waiver of the right of Homestead, and all of my rights whatsoever, of, in and to the aforegranted premises and property.

In witness whereof the said parties of the first part, have hereunto set their hands and seals the day and year first above written.

Bruce G. Eaton. (Seal.) Martha L. Eaton. (Seal.)

Signed, sealed and delivered in the presence of W. P. Cudmore, Ray C. Eaton.

[fol. 3118] STATE OF COLORADO,
County of Weld, ss:

I, William P. Cudmore, a notary public in and for the said county, in the State aforesaid, do hereby certify that Bruce G. Eaton and Martha L. Eaton, who are personally known to me to be the same persons whose names are subscribed to the foregoing instrument, appeared before me this day in person, and acknowledged that they signed, sealed and delivered, the said instrument of writing as their free and voluntary acts, for the uses and purposes therein set forth, including the release and the waiver of their rights of Homestead in and to the properties therein described.

And I further certify that Martha L. Eaton, wife of the said Bruce G. Eaton, while separate and apart from her husband, was by me fully apprised of her rights and the effect of signing and acknowledging the said instrument, the contents and nature of which were explained to her by me, and thereupon, while so separate and apart from her said husband, and out of his hearing, she signed and acknowledged the said instrument, and acknowledged to me that she released and waived her rights of Homestead in, of and to the said properties, and also signed and acknowledged the said instrument, freely and voluntarily, for the uses and purposes therein set forth.

Given under my hand and notarial seal this 2nd day January, A. D. 1920.

William P. Cudmore, Notary Public. (Seal.)

My commission expires November 1, 1922.

[fol. 3119] [Endorsed:] 147232. Deed from Bruce G. Eaton and Martha L. Eaton, to The Divide Canal and Reservoir Company.

STATE OF WYOMING,
County of Albany, ss:

This instrument was filed for record this 9th day of June, 1933, at 9:00 o'clock A. M., and recorded in Book No. 7 of Waters Appropriations, at page 285.

A. H. Michelsen, County Clerk, by Ethel J. Rauner, Deputy.

2.25 Pd.

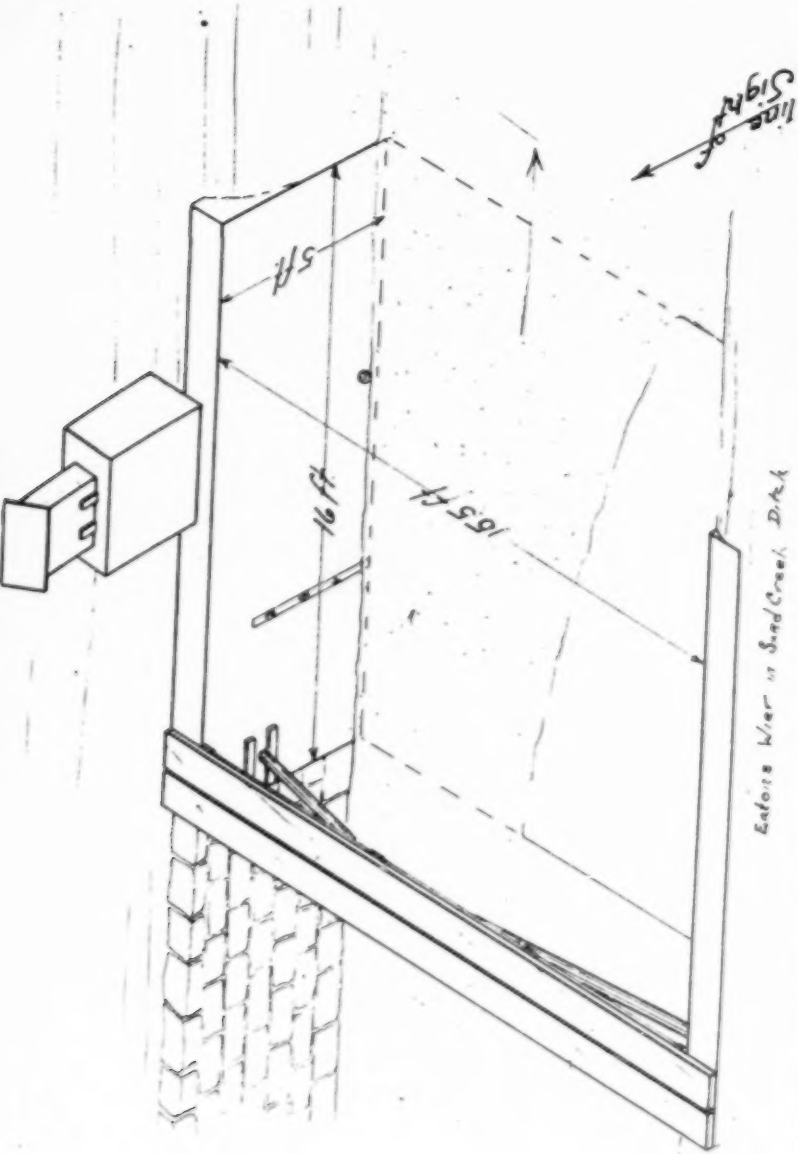
Examined. Indexed. Abstracted.

Divide Canal & Res. Co., Eaton, Colo.

1546

FOLD-OUT IS TOO LARGE TO BE FILMED

FOLD-OUT IS TOO LARGE TO BE FILMED



3123-3125

DEFENDANT'S EXHIBIT H-2

SAND CREEK FLUME OF THE WILSON SUPPLY DITCH

Mc Anelly 1922 Rating		Stimson 1933 Rating	
Gage Height ft.	Discharge cu. ft.	Gage Height ft.	Discharge cu. ft.
4	5.0	4	5.0
5	6.7	5	6.7
6	8.5	6	8.4
7	10.5	7	10.3
8	12.5	8	12.5
9	15.0	9	15.0
1.00	18.0	1.00	18.0
1.1	21.0	1.1	21.0
1.2	24.5	1.2	25.0
1.3	28.5	1.3	29.0
1.4	33.0	1.4	33.5
1.5	37.9	1.5	38.2
1.6	43.0	1.6	43.0
1.7	48.0	1.7	48.0
1.8	53.0	1.8	53.0
1.9	58.0	1.9	58.0
2.00	63.0	2.00	63.0
2.1	68.0	2.1	68.0
2.2	73.0	2.2	73.5
2.3	78.5	2.3	79.0
2.4	84.0	2.4	85.0
2.5	89.5	2.5	90.8
2.6	95.0	2.6	96.0
2.7		2.7	103.0
2.8		2.8	110.5
2.9		2.9	118.0
3.00		3.00	126.0
		3.1	136.0
		3.2	146.0
		3.3	156.0
		3.4	167.0

Following ratings were made from which the table was prepared

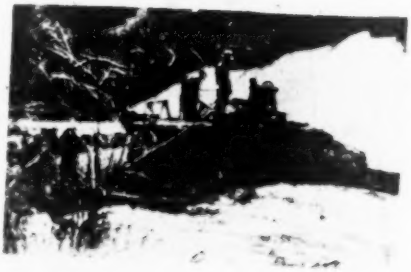
1.60	430
.83	13.88
3.10	136.00
3.25	151.79
2.77	109.57
2.43	89.10

DEFENDANT'S EXHIBIT I-2

DEFENDANT'S EXHIBIT J-2

DEFENDANT'S EXHIBIT K-2

DEFENDANT'S EXHIBIT L-2



DEFENDANT'S EXHIBIT M-2

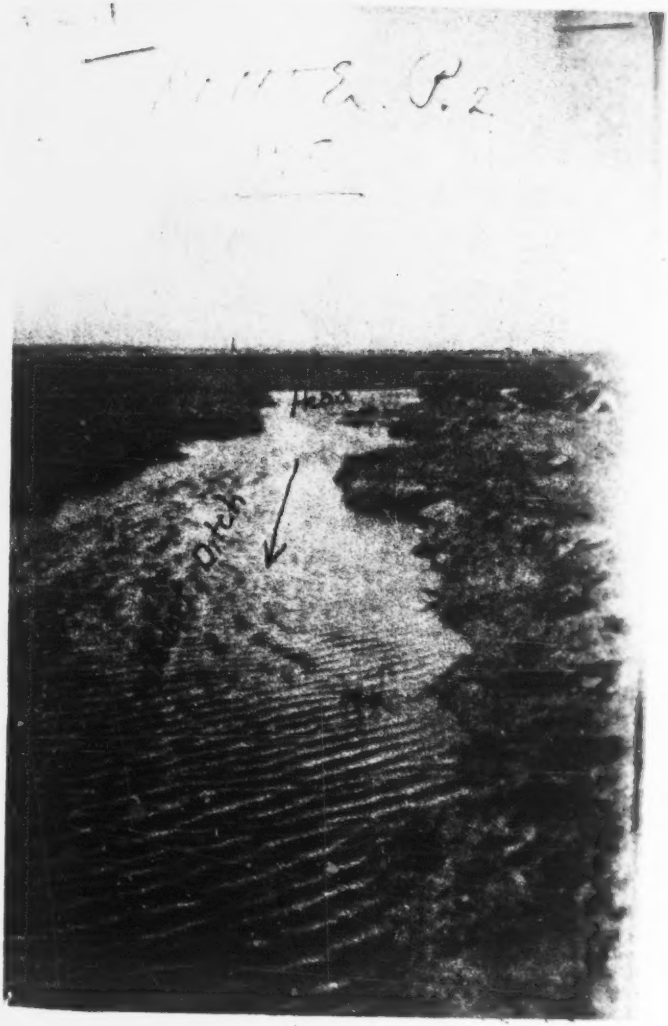
3131

DEFENDANT'S EXHIBIT N-2

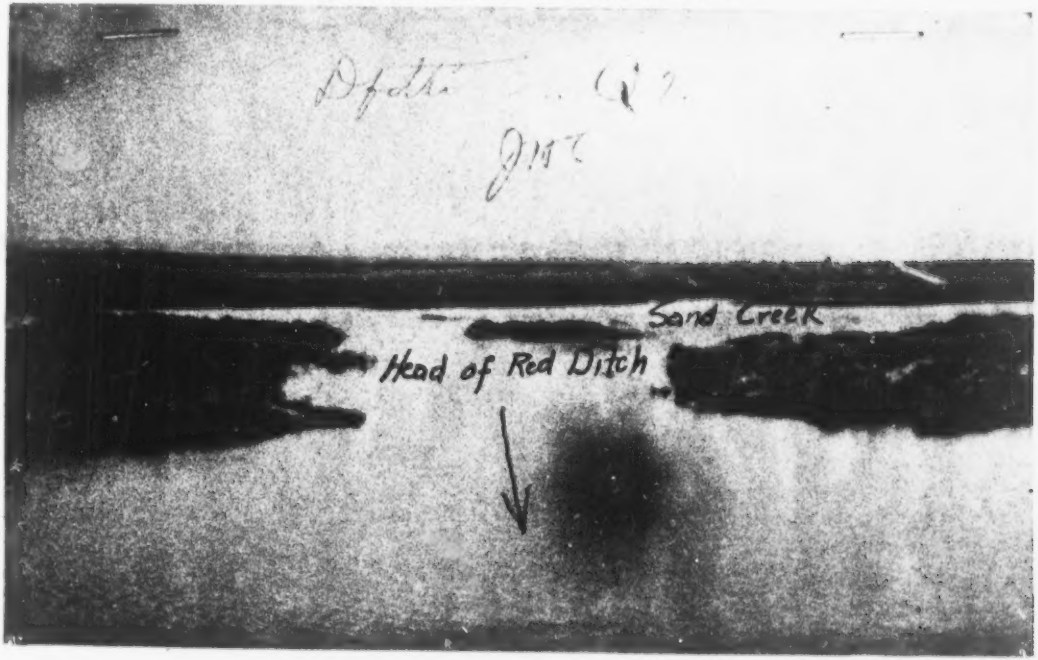
Dam in Sand Creek.
Head of unknown Ditch

DEFENDANT'S EXHIBIT O-2

DEFENDANT'S EXHIBIT P-2



DEFENDANT'S EXHIBIT Q-2



3135

1550

DEFENDANT'S EXHIBIT R-2

3136

DEFENDANT'S EXHIBIT S-2

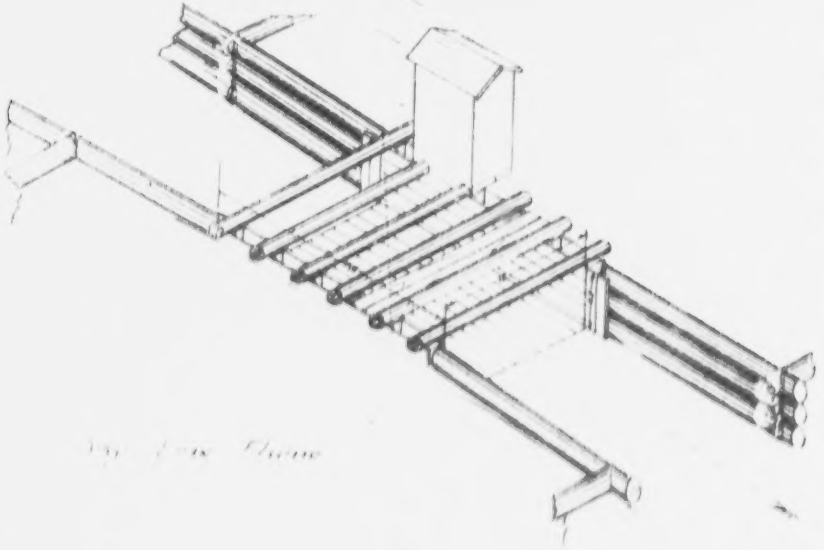
3137

DEFENDANT'S EXHIBIT T-2

3138

FOLD-OUT IS TOO LARGE TO BE FILMED

DEFENDANT'S EXHIBIT V-2



Vip Lens Flume

3141

1561

DEFENDANT'S EXHIBIT W-2

PHOTO 2 - DEFENDANT'S EXHIBIT W-2

PHOTO 3 - DEFENDANT'S EXHIBIT W-2

PHOTO 4 - DEFENDANT'S EXHIBIT W-2

PHOTO 5 - DEFENDANT'S EXHIBIT W-2

PHOTO 6 - DEFENDANT'S EXHIBIT W-2

3147

DEFENDANT'S EXHIBIT X-2

DEFENDANT'S EXHIBIT Y-2

S145

DEFENDANT'S EXHIBIT Z-2

STATE OF COLORADO

Engineering Department

Daily gage height, in feet, and discharge, in second-feet, of LARAMIE - POUDRE TUNNEL River at Rating Flume for year ending Nov. 28, 19

Drainage area. square miles. (observer) Gage read to Bristol Automatic Gage Continuous.

Day	OCT 1922		NOV 1922		DEC.		JAN.		FEB.		MAR.		Day	APR.		MAY		JUNE		JULY		AUG.		SEPT.		Day
	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.		Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	
1				(5)									1			11.0		20.5		18.5		7.5		(6)	1
2				(5)									2			11.0		24.5		18.5		7.5		(6)	2
3				(5)									3			11.0		26.5		18.5		7.5		(6)	3
4				(5)									4			16.5		29.5		15.5		11.0		(6)	4
5				(5)									5			18.0		32.0		15.5		11.0		(6)	5
6				(5)									6			23.5		32.0		18.5		12.5		(6)	6
7				(5)									7			20.5		32.0		16.5		12.5		(6)	7
8		(5)		(5)									8			16.5		75.5		14.5		12.5		(6)	8
9		(5)		(5)									9			12.5		98.0		15.5		11.0		(6)	9
10		(5)		(5)									10			14.5		112.0		14.5		11.0			10
11		(5)		(5)									11			20.5		112.0		14.5		11.0			11
12		(5)		(5)									12			20.5		119.0		14.5		9.0			12
13		(5)		(5)									13			16.5		98.0		14.5		9.0			13
14		(5)		(5)									14			14.5		105.0		12.5		(9)			14
15		(5)		(5)									15			14.5		64.5		12.5		(9)			15
16		(5)		(5)									16			16.5		34.0		12.5		(9)			16
17		(5)		(5)									17			22.5		72.0		12.5		(9)			17
18		(5)		(5)									18			41.5		77.0		11.0		(9)			18
19		(5)		(5)									19			34.0		94.5		11.0		(9)			19
20		(5)		(5)									20			27.0		100.0		11.0		(9)			20
21		(5)		(5)									21			24.0		102.0		9.0		(9)			21
22		(5)		(5)									22			34.0		76.0		9.0		(9)			22
23		(5)		(5)									23			34.0		91.0		9.0		(9)			23
24		(5)		(5)									24			29.0		86.0		9.0		(9)			24
25		(5)		(5)									25			26.5		80.5		9.0		(9)			25
26		(5)											26			39.0		39.0		9.0		(9)			26
27		(5)											27			36.5		32.0		7.5		(6)			27
28		(5)											28			26.5		24.5		7.5		(6)			28
29		(5)											29			34.0		20.5		7.5		(6)			29
30		(5)							"	"			30		14.5	22.0		20.5		7.5		(6)			30
31		(5)	"	"					"	"			31	"	"	24.5	"	"		7.5		(6)	"	"	31
Totals		(180)		(126)											14.5	763.0		1940.5		384.0		280.		(54)	
Mean																									
Sec.-ft. per square mile																									
Run-off, depth in inches																									
Run-off in acre-feet		236		248											29	1,611		3,850		765		555		107	
Maximum																									
Minimum																									

Total 7,200

Note.— Prepared under the direction of R. J. Tipton, May, 1923.
Copied by R. J. Tipton from Water Commissioner's records.
Figures enclosed thus ( ) were taken from W.C.'s weekly reports.
Others from W.C.'s daily records.

1. Northorne.
2. Eastborne.

3150

STATE OF COLORADO

Engineering Department

Daily gage height, in feet, and discharge, in second-feet, of LARAMIE-POUDRE TUNNEL River at Rating Flume for year ending September 30, 19 22

Drainage area. square miles. [.] Gage read by Bristol Automatic ~~Gurley~~ Continuous

Day	OCT. Gage height	OCT. Discharge	NOV. Gage height	NOV. Discharge	DEC. Gage height	DEC. Discharge	JAN. Gage height	JAN. Discharge	FEB. Gage height	FEB. Discharge	MAR. Gage height	MAR. Discharge	Day	APR. Gage height	APR. Discharge	MAY Gage height	MAY Discharge	JUNE Gage height	JUNE Discharge	JULY Gage height	JULY Discharge	AUG. Gage height	AUG. Discharge	SEPT. Gage height	SEPT. Discharge	Day
1													1				16.5		60.0		158.0		18.0		(9)	1
2													2				18.5		60.0		140.0		18.0		(9)	2
3													3				18.5		60.0		126		16.5		(9)	3
4													4				18.5		62.0		106		16.5		(9)	4
5													5				20.5		62.0		106		16.5		(9)	5
6													6				23.0		49.0		112		14.0		(9)	6
7													7				29.0		56.5		126		14.0		(9)	7
8													8				31.0				167		14.0		(9)	8
9													9				38.0				179		14.0			9
10													10				44.0				166		14.0			10
11													11				29.0				84		12.5			11
12													12				41.5				66.5		12.5			12
13													13				34.0				66.5		12.5			13
14													14				31.0				86		12.5			14
15													15				22.5				106		12.5			15
16													16				27.0				84		12.6			16
17													17		12.5		25.0				60		12.5			17
18													18		16.5		44.0				49		12.5			18
19													19		16.5		60.0				49		11.0			19
20													20		16.5		58.0				60		11.0			20
21													21		14.5		67.0				60		(11)			21
22													22		14.5		84.0				44		(11)			22
23													23		14.5		77.5				34		(11)			23
24													24		16.5		56.0				29		(11)			24
25													25		12.5		63.0				34		(11)			25
26													26		12.5		65.0				34		(9)			26
27													27		14.5		66.0				24.5		(9)			27
28													28		14.5		51.5		100.0		20.5		(9)			28
29													29		16.5		46.5		100.0		20.5		(9)			29
30									\"	\"\"			30		16.5		49.0		100.0		20.5		(9)			30
31			\"	\"\"					\"	\"\"			31	\"	\"\"		56.5	\"	\"\"		18		(9)	\"	\"\"		31
Total															209.0		1318.5		711.5		2440.5		366.5		(72)		5,138
Mean																											
Sec.-ft. per square mile																											
Runoff, depth in inches																											
Runoff in acre-feet															415		2,620		1,411		4,842		766		142		10,200
Maximum																											
Minimum																											

NOTE.—Prepared under the direction of R. J. Tipton, Engr. 1933.
Copied by R. J. Tipton from Water Commissioner's records.
Figures enclosed thus ( ) were taken from W.C.'s weekly reports.
Others from W. C.'s daily records.

3151

1575

STATE OF COLORADO

Engineering Department

Daily gage height, in feet, and discharge, in second-feet, of LARAMIE - POUDRE TUNNEL River at near Rating Flume for year ending November 30, 1924

Drainage area. square miles. (Measured) Gage read by Bristol Automatic ~~Manual~~ Continuous

Day	OCT. 1924 Gage height	OCT. 1924 Discharge	NOV. 1924 Gage height	NOV. 1924 Discharge	DEC. Gage height	DEC. Discharge	JAN. Gage height	JAN. Discharge	FEB. Gage height	FEB. Discharge	MAR. Gage height	MAR. Discharge
1		(3)		(0)								
2		(3)		(5)								
3		(3)		(5)								
4		(3)		(5)								
5		(3)		(5)								
6		(3)		(5)								
7		(3)		(5)								
8		(3)		(5)								
9		(3)										
10		(3)										
11		(4)										
12		(4)										
13		(4)										
14		(4)										
15		(4)										
16		(4)										
17		(4)										
18		(5)										
19		(5)										
20		(5)										
21		(5)										
22		(5)										
23		(5)										
24		(5)										
25		(5)										
26		(0)										
27		(0)										
28		(0)										
29		(0)										
30		(0)							XX	XXX		
31		(0)	XX	XXX					XX	XXX		
Total		(98)		(35)								
Mean												
Sec.-ft. per sq. mile												
Run-off depth in inches												
Run-off in acre-feet		194		70								
Maximum												
Minimum												

Day	APR. Gage height	APR. Discharge	MAY Gage height	MAY Discharge	JUNE Gage height	JUNE Discharge	JULY Gage height	JULY Discharge	AUG. Gage height	AUG. Discharge	SEPT. Gage height	SEPT. Discharge	Day
1								23		14.5		9	1
2								23		14.5		9	2
3								22		13		9	3
4								22		13		9	4
5								20		13		10	5
6								20		13		13	6
7								25		13		13	7
8								38.6		13		13	8
9								38.6		13		16.5	9
10								32		13		26	10
11								26		12		26	11
12				30				23.5		12		23.5	12
13				30				25		12		22.5	13
14				30				25		12		21	14
15				29				23		12		21	15
16				27				23.5		10.5		21	16
17				29				26		10.5		21	17
18				29				23.5		10.5		21	18
19				29				23.5		10.5		21	19
20				37				21		10.5		23	20
21				37				21		10.5		23	21
22				36				21		10.5		23	22
23				36				16		9		23	23
24				36				16		9		(23)	24
25				28				16		9		(23)	25
26				28				14.5		9		(23)	26
27				28				14.5		9		(23)	27
28				28				16.5		9		(3)	28
29				28				14.5		9		(3)	29
30						25		14.5		9		(3)	30
31	XX	XXX			XX	XXX		14.5		9	XX	XXX	31
Total				555		25		683.2		347.5		519.5	2,263
Mean													
Sec.-ft. per sq. mile													
Run-off depth in inches													
Run-off in acre-feet				1,101		50		1,355		690		1,030	4,490
Maximum													
Minimum													

Note: Prepared under the direction of R. J. Tipton, May, 1925.
Copied by R. J. Tipton from Water Commissioner's records.
Figures enclosed thus ( ) were taken from W. O.'s weekly reports.
Others from W. O.'s daily records.

1. Earthcore 2. Earthcore

3152

STATE OF COLORADO

Engineering Departme t

Daily gage height, in feet, and discharge, in second-feet, of LARAMIE - POUDRE TUNNEL River at mouth Rating Flume for year ending December 11, 19 25

Drainage area. square miles. [Location of gage and diversion.] Gage read by Bristol Automatic Continuous

Day	OCT. 1924 Gage height	OCT. Discharge.	NOV. 1925 Gage height	NOV. Discharge.	DEC. 1925 Gage height	DEC. Discharge.	JAN. Gage height	JAN. Discharge.	FEB. Gage height	FEB. Discharge.	MAR. Gage height	MAR. Discharge.
1		24.75		24.5		16.8						
2		24.75		24.7		15.5						
3		24.75		23.5		15.5						
4		23.5		23.5		15.5						
5		24.75		23.5		15.5						
6		29		22.8		15.5						
7		26		22.8		14.7						
8		24.7		22.2		15.5						
9		24.7		21.0		15.5						
10		26		18.8		15.5						
11		29		18.8		15.5						
12		26		18.7								
13		26		17.5								
14		24.7		17.5								
15		10.5		16.5								
16		10.5		16.5								
17		9.5		16.5								
18		9.5		16.5								
19		13		17.5								
20		26		17.5								
21		26		18.5								
22		26		17.5								
23		26		18.7								
24		24.7		17.5								
25		23.5		16.5								
26		23.5		16.5								
27		23.5		16.5								
28		23.5		16.5								
29		23.5		16.5								10
30		23.5		16.5					\"	\"\"		10
31		24.7	\"	\"\"					\"	\"\"		11
Total		706.0		569.		169.7						31
Mean												
Sec.-ft. per square mile												
Run-off in inches												
Run-off in acre-feet		1,401		1,130		337						62
Maximum												
Minimum												

Day	APR. Gage height	APR. Discharge.	MAY Gage height	MAY Discharge.	JUNE Gage height	JUNE Discharge.	JULY Gage height	JULY Discharge.	AUG. Gage height	AUG. Discharge.	SEPT. Gage height	SEPT. Discharge.
1		11		14		26		26		11		44.5
2		11		14		26		31		11		41.5
3		12		14		21		28.5		10		57.5
4		12		14		21		21		11		65.0
5		12		13.5		28.5		18.5		11		50.5
6		13		13.5		26		16.5		11		44.5
7		14		13.5		26		13.0		10		44.5
8		15		15		26		12.0		10		42.5
9		15.5		15		18.5		12.0		10		40.5
10		13		15		21.0		12.0		11		38.6
11		14		16.5		24.5		12.0		12		35.5
12		17.5		16.5		23.5		11.0		12		35.5
13		17.5		16.5		19.0		9.5		11		40.2
14		21		16.5		20		9.5		11		37.0
15		21		16.5		32		9.5		11		35.5
16		17.5		16.5		44.5		9.5		11		35.5
17		17.5		16.5		52		8.5		11		32.0
18		17.5		16.5		66		8.5		11		29.0
19		15.5		17.5		73		8.5		12		29.0
20		15.5		16.5		57.5		10.0		11		29.0
21		14		16.5		78		10.0		10		
22		14		16.0		112		10.0		9.5		
23		14		16.0		98		8.5		16.5		26
24		13		18.0		42.5		8.5		32.5		26
25		18.5		22.5		38		8.5		42.5		26
26		19.5		23.5		35		11.0		40.5		24.75
27		19.5		23.5		29		11		46.5		24.75
28		18.5		28.5		24.5		11		46.5		24.75
29		17		27.5		21		11		46.5		24.75
30		16.5		29.0		21		11		42.5		24.75
31	\"	\"\"		27.5	\"	\"\"		11		41.5	\"	\"\"
Total		467.5		554.		1146.		293.5		596.		1,016.75
Mean												
Sec.-ft. per square mile												
Run-off in inches												
Run-off in acre-feet		928		1,100		2,275		582		1,182		2,016
Maximum												
Minimum												

Year 5,641 — 11,260

Note.— Prepared under the direction of R. J. Tipton, May, 1933.
Copied by R. J. Tipton from Water Commissioner's records.

1st Quarter: 2nd Earthome, 1st Earthome

3153

1577

STATE OF COLORADO

Engineering Department

Daily gage height, in feet, and discharge, in second-feet, of LARAMIE-POUDRE TUNNEL River at Rating Flume for year ending September 30, 19 26

Drainage area ... square miles ... (observer) Gage read by Bristol Automatic Continuous

Day	OCT. Gage height	OCT. Discharge	NOV. Gage height	NOV. Discharge	DEC. Gage height	DEC. Discharge	JAN. Gage height	JAN. Discharge	FEB. Gage height	FEB. Discharge	MAR. Gage height	MAR. Discharge
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30									XX	XXX		
31			XX	XXX					XX	XXX		
TOTAL												
Mean												
Sec.-ft. per square mile												
Run-off, depth in inches												
Run-off in acre-feet												
Maximum												
Minimum												

Day	APR. Gage height	APR. Discharge	MAY Gage height	MAY Discharge	JUNE Gage height	JUNE Discharge	JULY Gage height	JULY Discharge	AUG. Gage height	AUG. Discharge	SEPT. Gage height	SEPT. Discharge
1			0.92	8 hrs 14	0.64	23	0.02	.9	0.42	14	0.70	26
2			0.92	40	0.57	20	0.02	.6	0.40	13	0.71	27
3			0.95	46	0.55	20	0.23	11	0.39	13	0.72	27
4			1.16	61	0.54	18	0.76	31	0.40	13	0.73	28
5			1.20	65	0.54	18	0.69	26	0.40	13	0.71	27
6			1.13	58	0.51	17	0.96	43	0.40	13	0.74	28
7			1.00	46	0.50	16	1.17	62	0.41	13	0.71	27
8			0.90	39	0.50	16	1.26	71	0.42	14	0.69	26
9			0.78	29	0.47	15	1.20	65	0.45	15	0.61	22
10			0.67	24	0.45	15	0.96	43	0.43	14	0.59	21
11			0.71	27	0.46	15	0.67	20	0.40	13	0.59	21
12			0.67	24	0.46	15	0.46	15	0.38	12	0.60	21
13			0.67	20	0.46	15	0.47	16	0.37	12	0.60	21
14			0.49	16	0.44	14	0.50	16	0.37	12	0.60	21
15				16.5*	0.43	14	0.50	16	0.37	12	0.60	21
16				18.7*	0.44	14	0.49	16	0.37	12	0.60	21
17				22.6*	0.36	12	0.48	16	0.37	12	0.57	20
18				24 *	0.26	8.8	0.46	15	0.37	12	0.53	18
19				21.4*	0.12	2.6	0.48	15	0.37	12	0.51	17
20				23 *		0	0.48	16	0.36	12	0.51	17
21				28.6*		0	0.48	16	0.37	12	0.51	17
22				26.2*	0.48	9½ hrs 6.5	0.46	15	0.41	13	0.50	16
23			0.78	28	0.25	11	0.48	15	0.51	17	0.44	15 hrs 5.8
24			0.78	29	0.42	14	0.47	15	0.72	27		
25			0.70	26	0.43	14	0.46	14	0.73	28		
26			0.78	29	0.43	14	0.46	14	0.77	30		
27			1.14	59	0.43	14	0.46	14	0.73	28		
28			0.74	28	0.42	14	0.47	15	0.72	27		
29			0.71	27	0.29	9.2	0.48	15	0.73	28		
30			0.70	26		0	0.44	14	0.72	27		
31	XX	XXX	0.70	26	XX	XXX	0.43	14	0.71	27	XX	XXX
TOTAL				975		385.1		674.6		520		498.8
Mean												
Sec.-ft. per square mile												
Run-off, depth in inches												
Run-off in acre-feet				1,926		764		1,340		1,030		990
Maximum												
Minimum												

Day	4th Quarter	3rd Quarter	2nd Quarter	1st Quarter
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				
Water year period				

Checked C. E. McGaw
Checked T. Hawthorne
Date 5/12/33

Note.—Prepared under the direction of R. J. Tipton, May, 1933.
*From Water Commissioner's daily records.
Other gage heights from charts.

3154

1578

STATE OF COLORADO

Engineering Department

Daily gage height, in feet, and discharge, in second-feet, of LARAMIE - POUDRE TUNNEL River at near 6Ft. Parshall Flume for year ending October 15, 19 27

Drainage area ____ square miles. (____ observer) Gage read to Bristol Automatic ELPHI Continuous

Day	OCT. 1926 Gage height	OCT. 1926 Discharge	NOV. Gage height	NOV. Discharge	DEC. Gage height	DEC. Discharge	JAN. Gage height	JAN. Discharge	FEB. Gage height	FEB. Discharge	MAR. Gage height	MAR. Discharge
1	0.94	22										
2	0.90	20										
3	0.93	21										
4	0.96	22										
5	0.94	22										
6	0.89	20										
7	0.84	18										
8	0.80	17										
9	0.79	16										
10	0.76	16										
11	0.59	10										
12	0.68	13										
13	0.63	11										
14	0.39	5.4										
15	0.26	16½ hrs 2.0										
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												
31			XX	XXX					XX	XXX		
Total		235.3										
Mean												
Sec.-ft. per sq. mile												
Run-off, depth in inches												
Run-off in acre-feet		467										
Maximum												
Minimum												

Day	APR. Gage height	APR. Discharge	MAY Gage height	MAY Discharge	JUNE Gage height	JUNE Discharge	JULY Gage height	JULY Discharge	AUG. Gage height	AUG. Discharge	SEPT. Gage height	SEPT. Discharge
1			0.76	30	0.79	16	0.95	22	0.47	7.2	0.23	2.3
2			0.79	31	0.77	16	0.76	15	0.45	6.2	0.25	2.5
3			0.79	31	0.80	17	0.89	20	0.50	7.9	0.27	3.0
4			0.78	31	0.78	16	1.16	30	0.47	7.2	0.26	2.8
5			0.71	27	0.85	18	1.40	41	0.46	7.0	0.26	2.6
6			0.76	29	0.78	16	0.93	21	0.45	6.2	0.26	2.6
7	0.31	10 hrs 6.1	0.77	30	0.94	22	0.77	16	0.46	7.0	0.26	2.6
8	0.25	11	0.86	36	1.36	39	0.70	14	0.50	7.9	0.26	2.8
9	0.26	11	0.78	31	1.64	58	0.78	14	0.46	7.0	0.21	1.9
10	0.27	12	0.70	26	1.64	58	0.81	17	0.40	5.6	0.24	16 hrs 1.7
11	0.26	12	0.71	27	1.62	47	0.69	13	0.40	5.6	0.42	8 hrs 2.1
12	0.27	12	0.77	30	1.23	33	0.56	12	0.41	5.8	0.71	14
13	0.26	12	0.77	30	1.08	27	0.65	12	0.42	6.0	0.92	21
14	0.27	12	0.88	37	1.26	39	0.66	12	0.41	5.8	1.12	29
15	0.27	12	0.98	45	1.99	72	0.60	11	0.45	6.7	0.99	24
16	0.25	11	0.89	38	0.97	28	0.57	9.8	0.41	5.8	0.90	20
17	0.26	11	0.62	22	1.24	38	0.57	9.8	0.27	4.9	0.91	21
18	0.26	12	0.28	16½ hrs 6.2	2.12	80	0.57	9.8	0.27	4.9	0.90	20
19	0.25	11	Installing		2.04	75	0.56	9.5	0.27	4.9	0.86	19
20	0.32	11	New	Flume	2.01	73	0.66	12	0.26	4.5	0.84	18
21	0.25	11	1.12	7½ hrs 9.1	1.67	64	0.71	14	0.25	4.5	0.81	17
22	0.25	11	1.07	27	1.21	37	0.64	12	0.25	4.5	0.92	21
23	0.26	12	0.99	24	1.73	58	0.56	9.5	0.24	4.3	0.96	22
24	0.28	12	0.87	19	2.18	82	0.58	10	0.21	3.7	1.08	25
25	0.43	14	0.80	17	2.21	85	0.54	9.5	0.23	4.1	1.12	29
26	0.67	20	0.92	21	2.32	92	0.60	7.9	0.24	4.3	1.12	29
27	0.65	22	0.91	21	2.27	95	0.60	11	0.32	4.1	1.01	24
28	0.68	25	0.88	20	2.26	94	0.64	12	0.32	3.9	0.97	23
29	0.58	20	0.85	18	2.18	83	0.58	10	0.21	3.7	0.94	22
30	0.66	24	0.81	17	1.74	58	0.53	8.7	0.29	3.3	0.73	14
31	XX	XXX	0.78	16	XX	XXX	0.49	7.7	0.26	4.7	XX	XXX
Total		327.1		748.4		1612		422.7		169.3		438.7
Mean												
Sec.-ft. per sq. mile												
Run-off, depth in inches												
Run-off in acre-feet		649		1,485		3,000		838		336		870
Maximum												
Minimum												

Day	Year
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	
26	
27	
28	
29	
30	
31	
Total	3864

4th Quarter: C. H. McCrew, T. Northorne, 5/12/33

3rd Quarter: C. H. McCrew, T. Northorne, 5/12/33

2nd Quarter: C. H. McCrew, T. Northorne, 5/12/33

1st Quarter: C. H. McCrew, T. Northorne, 5/12/33

Compared: ____ Date ____

Check approved: ____ Date ____

Check checked: ____ Date ____

NOTE:— Prepared under the direction of R. J. Tipton, May, 1933.
All gage heights from charts.

3155

STATE OF COLORADO

Engineering Department

Daily gage height, in feet, and discharge, in second-feet, of LARAMIE-POUDRE TUNNEL

River at 6' Parshall Flume

for year ending October 10, 1928

Gage read by Bristol Auto Continuous

Day	OCT. 1927 Gage height	OCT. 1927 Discharge	NOV. Gage height	NOV. Discharge	DEC. Gage height	DEC. Discharge	JAN. Gage height	JAN. Discharge	FEB. Gage height	FEB. Discharge	MAR. Gage height	MAR. Discharge	Day	APR. Gage height	APR. Discharge	MAY Gage height	MAY Discharge	JUNE Gage height	JUNE Discharge	JULY Gage height	JULY Discharge	AUG. Gage height	AUG. Discharge	SEPT. Gage height	SEPT. Discharge	Day
1	0.60	11											1			1.18	30	2.89	122	2.56	108	0.46	7.0	0.30	2.6	1
2	0.59	10											2			1.28	34	2.30	91	2.20	84	0.47	7.2	0.28	2.2	2
3	0.59	10											3			1.02	25	2.44	100	2.08	77	0.46	7.0	0.26	2.0	3
4	0.62	11											4			0.88	20	1.66	64	2.11	79	0.47	7.2	0.26	2.0	4
5	0.60	11											5			0.84	18	1.67	64	2.24	87	0.46	6.7	0.27	2.0	5
6	0.59	10											6			0.88	20	1.96	70	2.25	87	0.45	6.8	0.28	2.6	6
7	0.57	10											7			1.09	28	2.85	127	1.86	65	0.48	6.0	0.28	2.2	7
8	0.53	8.7											8			1.36	39	2.98	127	1.22	37	0.42	6.0	0.24	2.5	8
9	0.53	8.7											9	0.22	9 hrs 0.8	1.69	55	2.97	136	1.09	28	0.38	5.1	0.24	2.5	9
10	0.47	17 hrs 8.1											10	0.28	2.6	1.64	53	2.97	136	1.24	34	0.37	4.9	0.23	2.3	10
11													11	0.33	4.1	1.22	38	2.98	136	1.36	39	0.38	5.1	0.27	3.0	11
12													12	0.31	3.7	1.13	29	2.88	108	1.27	35	0.37	4.9	0.26	2.6	12
13													13	0.31	3.7	1.18	31	2.04	75	1.32	37	0.36	4.7	0.24	6½ hrs 0.7	13
14													14	0.25	4.6	1.20	32	1.68	55	1.24	34	0.36	4.7		0	14
15													15	0.32	4.1	1.11	28	1.26	35	0.99	24	0.37	4.9		0	15
16													16	0.31	3.7	1.09	28	1.43	42	1.22	33	0.36	4.8		0	16
17													17	0.35	4.6	1.23	33	1.48	45	1.51	46	0.34	4.8		0	17
18													18	0.39	5.4	1.44	43	1.22	35	1.01	24	0.34	4.8		0	18
19													19	0.38	4.8	1.33	38	0.82	17	0.74	16	0.33	4.1		0	19
20													20	0.34	4.3	1.13	29	0.77	16	0.67	13	0.35	2.9		0	20
21													21	0.29	5.4	1.17	31	0.82	17	0.68	12	0.35	2.9		0	21
22													22	0.37	4.9	1.24	34	0.96	22	0.63	11	0.28	4.1	0.66	8 hrs 4.4	22
23													23	0.33	4.1	1.28	36	1.01	24	0.68	13	0.33	4.1	0.66	12	23
24													24	0.45	6.7	1.29	36	1.20	32	0.64	12	0.21	3.7	0.62	11	24
25													25	0.54	9.0	1.42	42	1.44	43	0.60	11	0.28	3.9	0.62	11	25
26													26	0.54	9.0	1.44	43	1.66	52	0.52	8.6	0.35	4.1	0.57	9.8	26
27													27	0.72	14	1.86	64	2.11	79	0.50	7.9	0.27	4.9	0.62	11	27
28													28	0.85	18	2.96	126	2.51	104	0.81	8.2	0.30	2.8	0.67	13	28
29													29	0.83	18	2.41	98	2.82	127	0.52	8.6	0.28	3.2	0.61	11	29
30									XX	XXX			30	0.79	16	2.62	114	2.71	119	0.50	7.9	0.30	2.8	0.60	11	30
31			XX	XXX					XX	XXX			31	XX	XXX	2.80	125	XX	XXX	0.47	7.2	0.28	3.2	XX	XXX	31
TOTAL		95.5												151		1406		2218		1092.1		151.		126.1		5242
Mean																										
Sec.-ft. per square mile																										
Run-off, depth in inches																										
Run-off in acre-feet		189												300		2,790		4,400		2,170		300		264		10,403
Maximum																										
Minimum																										

Note.— Prepared under the direction of R. J. Tipton, May, 1933.
All gage heights from charts.

Quarter: 1st — T. Barthorne, P. C. Hart, 5/15/33

Quarter: 2nd — T. Barthorne, P. C. Hart, 5/15/33

Quarter: 3rd — T. Barthorne, P. C. Hart, 5/15/33

Quarter: 4th

Annual period

3156

STATE OF COLORADO

Engineering Department

Daily gage height, in feet, and discharge, in second-feet, of LARAMIE-POUDRE TUNNEL

River at mouth of 6' Parshall Flume

for year ending October 25 19 29

Drainage area ____ square miles. (observer.)

Gage read to Bristol Automatic ~~XXXXX~~ Continuous

Day	OCT. 1928 Gage height	OCT. 1928 Discharge	NOV. Gage height	NOV. Discharge	DEC. Gage height	DEC. Discharge	JAN. Gage height	JAN. Discharge	FEB. Gage height	FEB. Discharge	MAR. Gage height	MAR. Discharge
1	0.11	28										
2	0.27	36										
3	0.48	45										
4	0.94	22										
5	0.11	28										
6	0.08	27										
7	1.17	31										
8	1.35	39										
9	1.36	40										
10	1.22	33										
11	1.16	30										
12	1.36	39										
13	1.09	28										
14	1.06	26										
15	1.06	26										
16	1.06	26										
17	1.04	26										
18	1.01	24										
19	1.00	24										
20	0.94	22										
21	0.88	20										
22	0.86	19										
23	0.87	19										
24	0.67	13										
25	0.22	2.1										
26												
27												
28												
29												
30									XX	XXX		
31			XX	XXX					XX	XXX		
TOTAL		672.1										
Mean												
Sec.-ft. per square mile												
Runoff, depth in inches												
Runoff, in acre-feet		1,332										
Maximum												
Minimum												

Day	APR. Gage height	APR. Discharge	MAY Gage height	MAY Discharge	JUNE Gage height	JUNE Discharge	JULY Gage height	JULY Discharge	AUG. Gage height	AUG. Discharge	SEPT. Gage height	SEPT. Discharge
1					1.26	36	2.71	119	0.69	10.		
2					1.25	34	2.67	109	0.66	9.2		
3					1.20	32	2.43	99	0.65	8.7		
4					1.06	26	2.22	93	0.65	8.5		
5					1.07	27	1.87	65	0.65	8.7		
6					1.10	28	1.66	53	0.67	13		
7					1.17	31	1.59	50	0.60	11		
8			0.71	8 hrs 4.5	1.48	45	1.25	39	0.50	7.9		
9			0.72	14	1.84	63	0.96	22	0.46	7.0		
10			0.66	12	1.75	59	0.82	17	0.48	7.4		
11			0.58	10	1.41	42	0.72	14	0.46	7.0		
12			0.61	11	1.01	24	0.88	17	0.41	5.8		
13			0.75	15	1.04	26	1.01	24	0.42	6.0		
14			0.91	21	1.29	26	1.00	24	0.42	6.0		
15			1.13	29	1.48	45	1.09	28	0.40	5.6		
16			1.10	28	1.42	42	1.31	37	0.40	5.6		
17			1.10	28	1.66	53	1.69	60	0.42	6.0		
18			1.12	29	1.08	27	1.03	26	0.40	5.6		
19			1.16	30	0.98	23	0.71	14	0.40	5.6		
20			1.16	30	1.00	24	0.71	14	0.39	5.4		
21			1.36	39	1.28	40	0.66	12	0.29	5.4		
22			1.70	56	1.90	67	0.62	11	0.27	4.9		
23			1.75	59	2.12	80	0.68	11	0.26	4.7		
24			1.59	50	2.11	79	0.62	11	0.29	5.4		
25			1.49	45	2.11a	79	0.67	9.8	0.28	5.1		
26			1.22	37	2.62a	112	0.67	13	0.28	5.1	1.17	10½ hrs 14
27			1.29	36	2.67	116	0.61	11	0.46	7.0	1.16	30
28			1.28	36	3.02	143	0.59	10	0.48	7.4	1.17	31
29			1.22	37	2.89	132	0.59	10	0.40	5.6	1.24	34
30			1.48	43	2.88	129	0.59	10	0.29	5.4	1.20	32
31	XX	XXX	1.19	22	XX	XXX	0.60	11	0.29	16½ hrs 5.4	XX	XXX
TOTAL				731.6		1700		1022.8		209.7		141
Mean												
Sec.-ft. per square mile												
Runoff, depth in inches												
Runoff, in acre-feet				1,451		3,375		2,030		417		280
Maximum												
Minimum												

Day	4th	3rd	2nd	1st	Quarter
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					

Checked C. H. McGraw
T. Hawthorne
5/15/33

Checked C. H. McGraw
T. Hawthorne
5/15/33

Checked C. H. McGraw
T. Hawthorne
5/15/33

Note.-- Prepared under the direction of R. J. Tipton, May, 1933.
All gage heights from charts.
a, gage height partly estimated, chart incomplete.

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STATE OF COLORADO

Engineering Department

Daily gage height, in feet, and discharge, in second-feet, of LARAMIE-POUDRE TUNNEL River at mouth & Parshall Flume for year ending September 30, 19 32

Drainage area ____ square miles. Gage read by Bristol Automatic ~~Christy~~ Continuous

Day	OCT. Gage height.	OCT. Discharge.	NOV. Gage height.	NOV. Discharge.	DEC. Gage height.	DEC. Discharge.	JAN. Gage height.	JAN. Discharge.	FEB. Gage height.	FEB. Discharge.	MAR. Gage height.	MAR. Discharge.	Day	APR. Gage height.	APR. Discharge.	MAY Gage height.	MAY Discharge.	JUNE Gage height.	JUNE Discharge.	JULY Gage height.	JULY Discharge.	AUG. Gage height.	AUG. Discharge.	SEPT. Gage height.	SEPT. Discharge.	Day
1													1					0.98	23	0.62	11	0.50	7.9			1
2													2					0.77	16	0.62	11	0.48	7.4			2
3													3					0.72	15	0.60	11	0.47	7.2			3
4													4					0.72	14	0.57	9.8	0.46	7.0			4
5													5					0.71	14	0.58	10	0.46	7.0			5
6													6			0.70	6 hrs 7.1	0.76	15	0.57	9.8	0.47	7.2			6
7													7			0.69	13	0.91	21	0.56	9.5	0.52	8.5			7
8													8			0.67	13	1.10	28	0.54	9.0	0.65	12			8
9													9			0.66	12	1.05	26	0.52	8.5	0.55	9.7			9
10													10			0.67	13	1.14	30	0.52	8.5	0.53	8.7			10
11													11			0.64	12	1.26	35	0.53	8.7	0.48	7.4			11
12													12			0.57	9.8	1.41	42	0.60	11	0.48	7.4			12
13													13			0.68	10	1.23	38	0.79	16	0.57	9.8			13
14													14			0.60	11	1.13	29	0.62	11	1.02	25			14
15													15			0.61	11	1.06	26	0.56	10	1.11	28			15
16													16			0.62	11	1.05	26	0.56	9.2	0.79	16			16
17													17			0.67	13	1.08	27	0.53	8.7	0.56	9.8			17
18													18			0.66	12	1.01	24	0.56	9.8	0.47	7.2			18
19													19			0.68	13	0.82	18	0.62	11	0.44	6.5			19
20													20			0.65	12	1.00	24	0.57	9.8	0.42	6.2			20
21													21			0.67	13	1.11	28	0.56	9.6	0.41	5.8			21
22													22			0.69	13	1.19	32	0.56	10	0.28	3.2			22
23													23			0.66	12	1.06	26	0.60	11	0.09	18 hrs 0.3			23
24													24			0.64	12	0.79	16	0.62	11					24
25													25			0.63	11	0.76	15	0.67	13					25
26													26			0.60	11	0.72	14	0.53	8.7					26
27													27			0.62	11	0.62	11	0.60	7.9					27
28													28			0.64	12	0.60	11	0.49	7.7					28
29													29			0.69	13	0.58	10	0.52	8.5					29
30									XX	XXX			30			0.86	19	0.60	11	0.54	9.0					30
31			XX	XXX					XX	XXX			31	XX	XXX	1.15	30	XX	XXX	0.48	7.4			XX	XXX	31
TOTAL																	326.2		668		306.8		213.9			1872
Mean																										
Sec.-ft. per square mile																										
Run-off, depth in inches																										
Run-off in acre-feet																	647		1,320		608		425			3,000
Maximum																										
Minimum																										

Note.— Prepared under the direction of R. J. Tipton, May, 1932.
All gage heights from charts.

Hart P. G. Hart Hamilton 8/16/32

Hart P. G. Hart Hamilton 8/16/32

Hart P. G. Hart Hamilton 8/16/32

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STATE OF COLORADO

Engineering Department

Daily gage height, in feet, and discharge, in second-foot, of LARAMIE-POUDRE TUNNEL River at 6' Parshall Flume for year ending September 30, 1931

Gage read by Bristol Automatic Continuous

Prepared under the direction of R. J. Tipton, May, 1933.
All gage heights from charts.

Day	OCT. Gage height	OCT. Discharge	NOV. Gage height	NOV. Discharge	DEC. Gage height	DEC. Discharge	JAN. Gage height	JAN. Discharge	FEB. Gage height	FEB. Discharge	MAR. Gage height	MAR. Discharge	APR. Gage height	APR. Discharge	MAY Gage height	MAY Discharge	JUNE Gage height	JUNE Discharge	JULY Gage height	JULY Discharge	AUG. Gage height	AUG. Discharge	SEPT. Gage height	SEPT. Discharge	Day
1																	0.89	20	0.06	0	0.89	20			1
2																	0.92	21	0.05	0	0.73	14			2
3																	0.93	21	0.05	0	0.62	11			3
4																	1.00	24	0.24	2	0.59	10			4
5																	1.05	26	0.93	21	0.56	10			5
6																	1.10	28	1.00	24	0.56	10			6
7																	1.17	31	1.00	24	0.52	8			7
8																	1.16	30	0.99	24	0.49	8			8
9																	1.18	31	0.94	22	0.46	7			9
10																	1.08	27	0.92	21	0.44	6			10
11																	1.18	31	0.89	20	0.40	6			11
12																	1.04	26	0.87	19	0.29	5			12
13																	1.10	28	0.84	18	0.28	5			13
14																	1.05	26	0.81	17	0.28	5			14
15																	1.09	28	0.81	17	0.44	6			15
16																	1.16	30	0.78	16	0.47	7			16
17																	1.17	31	0.78	16	0.41	6			17
18																	1.12	29	0.78	16	0.29	5			18
19																	1.09	28	0.71	14	0.38	6			19
20																	1.07	27	0.69	13	0.29	5			20
21																	1.06	26	0.67	13	0.26	5			21
22																	1.05	26	0.63	11	0.26	4.6			22
23																	1.07	27	0.61	11	0.48	6.7			23
24																	1.08	27	0.61	11	0.24	4.3			24
25															0.74	11 (17 hrs)	1.08	27	0.66	12	0.21	3.7			25
26															0.78	16	0.86	18	0.66	12	0.20	3.5			26
27															0.84	18	0.91	21	0.70	14	0.28	3.2			27
28															0.77	16	0.38	5	0.65	12					28
29															0.76	16	0.07	0	0.80	17					29
30									XX	XXX															30
31			XX	XXX					XX	XXX			XX	XXX	0.80	17	XX	XXX	0.74	16			XX	XXX	31
Total																108		720		448		189.9			
Mean																									
Sec.-ft. per square mile																									
Run-off, depth in inches																									
Run-off in acre-feet																214		1,430		879		377			
Maximum																									
Minimum																									

Year period: 1461

Quarter: 4th — Checked: J. E. Whitten, C. E. McGrew, 2/10/33
Quarter: 3rd — Checked: J. E. Whitten, C. E. McGrew, 2/10/33
Quarter: 2nd — Checked: J. E. Whitten, 2/10/33
Quarter: 1st — Checked: J. E. Whitten, 2/10/33

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STATE OF COLORADO

Engineering Department

October 11

Daily gage height, in feet, and discharge, in second-feet, of LARAMIE-POUDRE TUNNEL River at 6' Parshall Flume for year ending September 30, 19 32

Drainage area ____ square miles. (____ observer.) Gage read to Bristol Automatic Gages continuous

Day	OCT. 1932 Gage height	OCT. 1932 Discharge	NOV. Gage height	NOV. Discharge	DEC. Gage height	DEC. Discharge	JAN. Gage height	JAN. Discharge	FEB. Gage height	FEB. Discharge	MAR. Gage height	MAR. Discharge	Day	APR. Gage height	APR. Discharge	MAY Gage height	MAY Discharge	JUNE Gage height	JUNE Discharge	JULY Gage height	JULY Discharge	AUG. Gage height	AUG. Discharge	SEPT. Gage height	SEPT. Discharge	Day
1	0.88	10											1					1.57	50	2.71	119	1.33	36	1.19	32	1
2	0.87	10											2					1.53	47	2.57	109	1.26	34	1.07	27	2
3	0.87	10											3					1.51	46	2.44	100	1.16	30	1.00	24	3
4	0.89	11											4					1.56	49	2.42	98	1.09	28	0.96	22	4
5	0.89	11											5					1.64	53	1.80	61	1.05	26	0.95	22	5
6	0.87	10											6					1.61	52	1.26	34	1.00	24	0.93	21	6
7	0.83	9											7					1.63	53	1.41	42	0.98	23	0.93	21	7
8	0.84	9											8					1.67	55	1.54	48	0.93	21	0.89	20	8
9	0.83	9											9					2.00	72	1.53	47	0.91	20	0.84	18	9
10	0.60	11											10					1.94	68	1.60	51	1.16	30	0.84	18	10
11	0.71	21 12 hrs											11			0.22	16 2.9 hrs	1.60	51	1.70	56	1.62	52	0.82	18	11
12													12			1.05	26	1.64	53	1.90	66	1.61	52	0.79	17	12
13													13			1.26	39	1.80	61	1.68	55	1.58	50	0.78	16	13
14													14			1.30	36	1.98	71	1.64	53	1.52	47	0.77	16	14
15													15			1.56	49	2.26	88	1.57	50	1.44	43	0.74	15	15
16													16			1.28	35	2.48	103	1.54	48	1.60	51	0.71	14	16
17													17			1.29	36	2.07	76	1.51	46	1.38	40	0.71	14	17
18													18			1.48	46	1.87	65	1.50	46	1.26	29	0.70	14	18
19													19			1.60	51	2.00	72	1.47	45	1.21	26	0.69	14	19
20													20			1.81	62	2.33	92	1.47	45	0.84	18	0.67	13	20
21													21			1.80	61	2.36	94	1.39	40	0.93	21	0.69	14	21
22													22			2.03	74	2.71	119	1.33	38	0.89	20	0.68	13	22
23													23			1.71	56	2.10	146	1.22	37	0.85	18	0.68	13	23
24													24			1.51	46	3.06	143	1.23	33	1.16	31	0.67	13	24
25													25			1.70	56	3.26	158	1.14	30	1.29	36	0.68	13	25
26													26			1.42	42	3.19	152	1.09	28	1.26	34	0.69	11	26
27													27			1.28	34	3.44	172	1.17	31	1.32	38	0.68	10	27
28													28			1.41	42	3.28	159	1.19	32	1.27	35	0.67	10	28
29													29			1.46	44	3.15	150	1.27	35	1.19	32	0.67	10	29
30									XX	XXX			30			1.58	50	2.98	138	1.28	35	1.24	34	0.66	10	30
31			XX	XXX					XX	XXX			31	XX	XXX	1.56	49	XX	XXX	1.20	36	1.38	37	XX	XXX	31
Total		112															935.9		2708		1594		1038		493	6881
Mean																										
Sec.-ft. per square mile																										
Run-off, depth in inches																										
Run-off in acre-feet		222															1,856		5,373		3,160		2,060		978	13,649
Maximum																										
Minimum																										

Note.— Prepared under the direction of R. J. Tipton, Dy. 1933.
All gage heights from charts.

4th Qtr. 3rd Qtr. 2nd Qtr. 1st Qtr. Quarter period — Computed ____ Checked ____ Date ____
L. T. Burgess T. Hawthorne 5/11/33
Duck applied ____ Duck checked ____ Date ____
L. T. Burgess T. Hawthorne 5/11/33
G H applied ____ G H checked ____ Date ____
Year period

3160

DEFENDANT'S EXHIBIT A-3

STATE OF COLORADO

Engineering Department

Daily gage height, in feet, and discharge, in second-feet, of SKY-LINE DITCH River at Rating Flume for year ending October 31, 19 23

Drainage area ..... square miles. (..... , observer) Gage read by Bristol Automatic Continuous

Day	OCT. Gage height	OCT. Discharge	NOV. Gage height	NOV. Discharge	DEC. Gage height	DEC. Discharge	JAN. Gage height	JAN. Discharge	FEB. Gage height	FEB. Discharge	MAR. Gage height	MAR. Discharge	Day	APR. Gage height	APR. Discharge	MAY Gage height	MAY Discharge	JUNE Gage height	JUNE Discharge	JULY Gage height	JULY Discharge	AUG. Gage height	AUG. Discharge	SEPT. Gage height	SEPT. Discharge	Day
1													1					1.88	108	2.18	136	1.61	85	0.88	21	1
2													2					1.89	111	2.27	152	1.60	82	0.82	19	2
3													3					1.98	130	2.27	152	1.59	81	0.80	17.8	3
4													4					1.88	107	2.21	136	1.64	76	0.77	16	4
5													5					1.88	108	2.21	136	1.61	72	0.78	14	5
6													6					1.76	98	2.20	137	1.46	68	0.78	14	6
7													7					1.88	109	2.21	136	1.59	62	0.71	13	7
8													8					1.93	116	2.22	139	1.[illegible]	57	0.70	12.5	8
9													9					1.27	81	2.19	136	1.29	57	0.67	11.2	9
10													10					0.82	19	2.20	137	1.24	52	0.65	9.4	10
11													11					0.81	18	2.28	138	1.40	63	0.61	8.8	11
12													12					0.76	16	2.20	137	1.28	59	0.60	8.0	12
13	--	12.8*											13					0.87	22	2.24	142	1.20	54	0.62	8.9	13
14	.70	12.8*											14					1.14	40	2.25	139	1.21	56	0.66	10.7	14
15	.70	12.8*											15					1.20	45	2.29	156	1.28	57	0.64	15 Est 8.1	15
16	.68	10.8*											16					1.25	15 Hrs 50	2.24	150	1.28	56			16
17	.68	11.6*											17						0	2.25	149	1.25	52			17
18	.70	12.5*											18						0	2.25	147	1.20	48			18
19	.68	10.2*											19			0.78	9 Hrs 8.1		0	2.24	150	1.17	48			19
20	.68	10.2*											20			0.85	19		0	2.25	149	1.18	39			20
21		(10)											21			0.89	21 Hrs 20		0	2.25	149	1.06	36			21
22		(10)											22			0	0		0	2.22	147	1.05	34			22
23		(10)											23			1.00	4 Hrs 1.0	1.26	9 Hrs 22	2.12	137	0.98	29			23
24		(10)											24			0.68	8.9	1.28	87	2.09	132	0.94	27			24
25		(10)											25			1.20	45	1.28	82	2.01	123	0.92	25			25
26		(10)											26			1.44	67	1.26	80	2.00	122	0.93	25			26
27		(10)											27			1.36	78	1.27	81	1.93	116	0.91	24			27
28		(8)											28			1.24	76	1.27	79	1.84	106	0.86	22			28
29		(8)											29			1.45	68	1.94	116	1.76	97	0.85	20			29
30		(8)							XX	XXX			30			1.50	72	2.02	124	1.66	88	0.84	20			30
31		(8)	XX	XXX					XX	XXX			31	XX	XXX	1.78	94	XX	XXX	1.61	83	0.89	22	XX	XXX	31
TOTAL		194.5															868		1662		4377		1804		189.8	8485
Mean																										
Sec.-ft. per square mile																										
Run-off, depth in inches																										
Run-off in acre-feet		386															1,109		3,300		8,680		2,980		377	16,830
Maximum																										
Minimum																										

Note.— Prepared under the direction of R. J. Tipton, Div. Eng.

*From Water Commissioner's daily records.

( ) From V.O.'s weekly reports.

Other O.E.s from chart record.

1st Quarter: Checked P. C. Hart 5/10/23; Checked ..... Date .....

2nd Quarter: Checked P. C. Hart 5/10/23; Checked ..... Date .....

3rd Quarter: Checked P. C. Hart 5/10/23; Checked ..... Date .....

4th Quarter: Checked ..... Date .....

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STATE OF COLORADO

Engineering Department

Daily gage height, in feet, and discharge, in second-feet, of SKY-LINE DITCH

Drainage area ____ square miles. (____ measured.)

River at ____ Rating Flume

Gage read to Bristol Automatic continuous

for year ending November 14 24

Day	OCT. 1923 Gage height	OCT. 1923 Discharge	NOV. 1924 Gage height	NOV. 1924 Discharge	DEC. Gage height	DEC. Discharge	JAN. Gage height	JAN. Discharge	FEB. Gage height	FEB. Discharge	MAR. Gage height	MAR. Discharge
1				(5)								
2				(5)								
3				(5)								
4				(5)								
5				(5)								
6				(5)								
7				(5)								
8				(5)								
9				(5)								
10				(5)								
11				(5)								
12		(7)		(5)								
13		(7)		(5)								
14		(7)		(5)								
15		(7)										
16		(7)										
17		(7)										
18		(7)										
19	0.61	8.5										
20	0.56	6.8										
21	0.50	5.0										
22	0.46	3.8										
23	0.39	2.8										
24	0.47	4.4										
25	0.50	5.0										
26		(5)										
27		(5)										
28		(5)										
29		(5)										
30		(5)							XX	XXX		
31		(5)	XX	XXX					XX	XXX		
TOTAL		115.3		(58)								
Mean												
Sec.-ft. per square mile												
Run-off, depth in inches												
Run off in acre-feet		228		(115)								
Maximum												
Minimum												

Day	APR. Gage height	APR. Discharge	MAY Gage height	MAY Discharge	JUNE Gage height	JUNE Discharge	JULY Gage height	JULY Discharge	AUG. Gage height	AUG. Discharge	SEPT. Gage height	SEPT. Discharge
1					1.00	80		162°		54 °		6.8°
2					0.96	27		159°		54 °		4.4°
3					1.19	44		162°		51 °		6.0°
4					1.40	68		162°		47 °		5.6°
5					1.50	78		161°		46 °		6.2°
6					1.21	10 hrs 25		161°		50 °		7.1°
7								158°		44 °		
8								158°		41 °		
9								149°		38 °		
10								148°		35 °		
11								141°		30 °		
12								132°		30 °		
13				10 hrs				129°		30 °		
14			1.16	26				122°		30 °		
15			1.17	43				105°		28 °		
16			1.19	44				107°		29 °		
17			1.20	45				103°		26 °		
18			1.25	50				113°		22 °		
19			1.06	34				100°		21 °		
20			0.95	27	1.85	13 hrs 56		91°		17.5°		
21			1.16	41	1.96	118		84°		17.5°		
22			1.28	52	2.09	132		75°		17 °		
23			1.23	57	2.16	143		72°		16.5°		
24			1.28	50	2.24	150		72°		16.5°		
25			1.29	52	2.30	157		70°		13 °		
26			1.26	59	2.31	158		67°		12.5°		
27			1.21	56	2.26	164		61°		12 °		
28			1.19	44	2.25	16 hrs 102		57°		11 °		
29			1.02	31				61°		9.2°		
30			1.03	32		158°		68°		6.2°		
31	XX	XXX	1.01	31	XX	XXX		58°		6.8°	XX	XXX
				774		1605		3442		862.8		36.1
												6892
				1,536		3180		6,830		1,712		70
												13,670

Day	4th	3rd	2nd	1st	Quarter
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
Year period					

Compared: P. C. Hart Checked: T. Berthoume Date: 5/10/33

Compared: P. C. Hart Check applied: T. Berthoume Check checked: Date: 5/10/33

Compared: P. C. Hart G. H. applied: T. Berthoume G. H. checked: Date: 5/10/33

NOTE.-- Prepared under the direction of E. J. Tipton, May 1933.
"From the Water Commissioner's daily records.
( ) From W.C.'s weekly reports.
Other G. H.s from chart record.

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STATE OF COLORADO

Engineering Department

Daily gage height, in feet, and discharge, in second-feet, of SIX-LINE DITCH (Discharge area ... square feet.) (Gage read by ...) River at Bristol Rating Flume for year ending September 30, 19 25

Automatic ~~Chart~~ Continuous

November 7

Day	OCT. 1924 Gage height	OCT. 1924 Discharge	NOV. 1924 Gage height	NOV. 1924 Discharge	DEC. Gage height	DEC. Discharge	JAN. Gage height	JAN. Discharge	FEB. Gage height	FEB. Discharge	MAR. Gage height	MAR. Discharge	Day	APR. Gage height	APR. Discharge	MAY Gage height	MAY Discharge	JUNE Gage height	JUNE Discharge	JULY Gage height	JULY Discharge	AUG. Gage height	AUG. Discharge	SEPT. Gage height	SEPT. Discharge	Day
1			0.36	2.0									1			0.58	7.4	1.48	70	1.99	121	0.98	29			1
2			0.36	2.2									2			0.58	7.4	1.42	66	2.00	122	0.98	28			2
3			0.37	2.4									3			0.70	18	1.52	78	1.97	119	0.98	28			3
4			0.28	0.9									4			0.64	9.8	1.29	62	1.90	112	0.99	29			4
5			0.29	1.0									5			0.76	16	1.36	69	1.94	116	0.99	29			5
6			0.37	2.4									6			0.80	18	1.34	68	2.05	128	0.99	29			6
7			0.28	1.8									7			0.81	18	1.12	59	2.00	122	0.96	27			7
8													8			0.84	20	1.17	62	1.92	114	0.98	29			8
9													9			0.82	19	1.27	69	1.68	97	0.93	25			9
10													10			0.79	17	1.58	80	1.33	75	0.98	28			10
11													11			0.80	18	1.44	67	1.48	70	1.26	50			11
12													12			0.88	21	1.21	46	1.58	80	1.29	53			12
13													13			0.96	27	1.25	50	1.57	79	1.21	46			13
14	0.60	7.6											14			0.96	27	1.09	91	1.46	70	1.16	42			14
15	0.79	17											15			0.88	19	1.94	116	1.21	55	1.09	26			15
16	0.72	14											16			0.81	18	2.12	127	1.11	28	1.00	30			16
17	0.67	11											17			0.91	24	2.14	128	1.48	70	0.98	28			17
18	0.67	9.1											18			0.98	28	2.12	126	1.63	88	0.97	26			18
19	0.41	3.2											19			1.02	31	2.22	147	1.66	78	1.10	37			19
20	0.30	1.0											20			1.14	40	2.19	144	1.68	87	1.04	33			20
21	0.28	0.9											21			1.25	48	2.19	144	1.54	76	0.98	27			21
22	0.28	0.9											22			1.25	48	2.18	143	1.58	80	0.95	27			22
23	0.31	1.2											23			1.18	41	2.10	133	1.42	66	0.64	9.8			23
24	0.40	3.0											24			1.25	47	2.18	142	1.42	65	0.23	1.6			24
25	0.36	2.2											25			1.46	59	2.16	140	1.28	57	0.40	3.0			25
26	0.33	1.6											26			1.62	84	2.07	130	1.28	60	0.31	1.8			26
27	0.80	1.0											27			1.64	86	2.06	129	1.40	45	0.26	1.4			27
28	0.38	2.0											28			1.96	117	2.03	125	1.16	42	0.34	1.8			28
29	0.44	3.8											29			1.89	111	2.96	118	1.13	39	0.30	1.7			29
30	0.44	3.8							XX	XXX			30	0.88	4.3	1.93	116	1.95	117	1.09	36	0.27	1.4			30
31	0.40	3.0	XX	XXX					XX	XXX			31	XX	XXX	1.66	96	XX	XXX	1.12	39	XX	XX			31
Total		84.2		12.7											4.3		1854.4		3995		1418		726			7802
Mean																										
Sec.-ft. per square mile																										
Runoff, depth in inches																										
Equivalent in ...		167		25											9		3,680		7,925		2,812		1,440			15,467
Maximum																										
Minimum																										

Prepared under direction of R. J. Tipton, May 1933
All gage heights from chart record.

Notes:

Chart changed Nov. 11, 1923 — Chart changed May 11, 1925 — Chart changed May 11, 1925

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STATE OF COLORADO

Engineering Department

Daily gage height, in feet, and discharge, in second-feet, of SKY - LINE DITCH (observer) Gage read by Automatic

Drainage area ... square miles. River at Bristol Rating Flume Continuous

for year ending September 30, 1926

Day	OCT. Gage height	OCT. Discharge	NOV. Gage height	NOV. Discharge	DEC. Gage height	DEC. Discharge	JAN. Gage height	JAN. Discharge	FEB. Gage height	FEB. Discharge	MAR. Gage height	MAR. Discharge	APR. Gage height	APR. Discharge	MAY. Gage height	MAY. Discharge	JUNE. Gage height	JUNE. Discharge	JULY. Gage height	JULY. Discharge	AUG. Gage height	AUG. Discharge	SEPT. Gage height	SEPT. Discharge
1																	2.14	138	2.26	150	1.37	60.3	0.28	1.4
2																	2.14	138	2.25	147	1.34	57.6	0.30	1.0
3																	2.16	140	2.25	147	1.36	59.4	0.32	1.4
4																	2.18	143	2.20	145	1.38	61.2	0.34	2.2
5																	2.19	144	2.16	140	1.34	57.6	0.31	1.2
6																	2.24	160	2.17	141	1.38	58.8	0.28	0.9
7																	2.21	146	2.20	145	1.42	64.8	0.40	3.0
8																	2.19	144	2.19	144	1.46	68.4	0.42	2.8
9																	2.09	128	2.19	144	1.56	78.0		
10																	2.14	136	2.20	145	1.50	72.0		
11																	2.23	149	2.18	139	1.42	65.7		
12															0.50	5.0	2.27	153	2.09	132	1.30	54.0		
13															0.64	9.8	2.29	156	2.07	130	1.22	46.8		
14															0.70	12.5	2.26	155	2.04	126	1.20	45.0		
15															0.80	17.5	2.27	152	1.98	120	1.13	39.6		
16															0.87	21.7	1.98	117	1.98	114	1.10	37.0		
17															0.92	24.8	1.04	32.8	1.98	114	1.10	37.0		
18															0.88	22.3	1.12	38.6	1.88	110	1.08	36.6		
19															0.88	22.2	1.14	40.2	1.88	110	1.04	32.8		
20															1.09	26.3	0.93	25.6	1.87	109	0.99	29.4		
21															1.27	60.3	0.88	22.2	1.88	104	0.99	29.4		
22															1.51	72.0	0.98	26.8	1.71	92.0	0.96	27.4		
23															1.66	87.0	1.56	78.0	1.67	89.0	0.68	11.6		
24															1.73	95.0	2.08	128	1.68	86.0	0.40	3.0		
25															1.87	109.0	2.19	137	1.54	76.0	0.36	2.6		
26															1.85	107	2.20	145	1.47	69.3	0.36	2.8		
27															1.87	60.3	2.22	147	1.49	71.1	0.34	1.8		
28															1.83	105	2.22	149	1.61	83.0	0.36	2.8		
29															1.83	106	2.24	150	1.80	72.0	0.38	1.6		
30									XX	XXX					1.88	110	2.26	152	1.44	66.6	0.32	1.4		
31			XX	XXX					XX	XXX			XX	XXX	2.08	126	XX	XXX	1.28	62.1	0.32	1.4	XX	XXX
TOTAL															1208.8		3551.2		3523.1		1145.1		13.4	
Mean																								
Sec.-ft. per square mile																								
Run-off, depth in inches																								
Run-off in acre-feet															2400		7060		6990		2270		27	
Maximum																								
Minimum																								

Day: 1st quarter, 2nd quarter, 3rd quarter, 4th quarter

Note.— Prepared under the direction of R. J. Tipton, May, 1923.
All gage heights from chart record.

F. C. Hart
T. Harthorne
May 8, 1923

F. C. Hart
T. Harthorne
May 8, 1923

F. C. Hart
T. Harthorne
May 8, 1923

STATE OF COLORADO

Engineering Department

Daily gage height, in feet, and discharge, in second-feet, of SKYLINE DITCH

Drainage area ____ square miles. (Location.) ____ (Gage read by) Bristol Automatic (River at) ____ Rating flume (Datum of gage) ____ (Method of measurement) continuous.

November 12, 19__ for year ending September 30, 19__

Day	OCT. 1929 Gage height	OCT. 1929 Discharge	NOV. 1929 Gage height	NOV. 1929 Discharge	DEC. Gage height	DEC. Discharge	JAN. Gage height	JAN. Discharge	FEB. Gage height	FEB. Discharge	MAR. Gage height	MAR. Discharge
1				* 8.9								
2				*17.2								
3				*11.0								
4				*11.0								
5				*11.0								
6				*11.0								
7				*11.0								
8				*11.0								
9				*11.0								
10				*11.0								
11				*11.0								
12				*11.0								
13		*		0								
14		*11.0										
15		*11.0										
16		*11.0										
17	0.64	12										
18	0.66	13										
19	0.66	13										
20	0.63	12										
21	0.62	12										
22	0.62	12										
23	0.60	11										
24	0.57	10										
25	0.58	10										
26	0.60	11										
27	0.58	10										
28	0.58	10										
29	0.47	7.3										
30	0.36	4.7										
31	0.48	7.5	XX	XXX					XX	XXX		
Total		194.5		136.1								
Mean												
Second-feet per square mile												
Runoff, depth in inches												
Total acre-feet		386		270								
Maximum												
Minimum												

Day	APR. Gage height	APR. Discharge	MAY Gage height	MAY Discharge	JUNE Gage height	JUNE Discharge	JULY Gage height	JULY Discharge	AUG. Gage height	AUG. Discharge	SEPT. 1929 Gage height	SEPT. 1929 Discharge
1					1.45	67	2.21	154	1.45	66	0.98	29
2					1.49	70	2.20	152	1.58	73	0.96	27
3					1.53	74	2.22	157	1.49	70	0.94	26
4					1.56	76	2.28	165	1.41	63	0.96	27
5					1.71	92	2.32	173	1.39	61	0.92	25
6					1.84	106	2.29	166	1.36	60	0.93	26
7				*12.0	1.98	125	2.25	157	1.41	63	0.91	25
8				0	2.17	148	2.14	144	1.42	64	0.88	23
9				0	2.22	155	2.16	146	1.33	56	0.87	22
10				0	2.26	162	2.24	159	1.26	51	0.88	23
11				0	2.29	166	2.14	145	1.31	55	0.76	17
12				0	2.25	160	2.10	138	1.27	52	0.26	4.7
13				0	2.16	146	2.09	137	1.21	47	0.22	3.6
14				0	2.16	146	1.93	117	1.22	48		
15				0	2.04	130	1.87	110	1.27	52		
16				0	2.15	145	1.86	108	1.26	51		
17			1.47	28	2.15	145	1.81	103	1.20	46		
18			1.39	61	2.29	166	1.78	100	1.16	43		
19			1.31	55	2.30	168	1.75	96	1.15	42		
20			1.41	63	2.31	170	1.76	98	1.16	43		
21			1.57	78	2.31	170	1.79	101	1.09	37		
22			1.69	90	2.30	168	1.71	92	1.18	44		
23			1.51	72	2.15	146	1.68	89	1.19	45		
24			1.27	60	2.24	174	1.57	78	1.13	40		
25			1.38	60	2.27	179	1.60	71	1.14	41		
26			1.46	67	2.27	179	1.62	73	1.24	49		
27			1.52	73	2.29	182	1.59	80	1.16	44		
28			1.60	81	2.41	186	1.57	78	1.13	40		
29			1.62	73	2.38	181	1.68	76	1.09	37		
30			1.49	70	2.30	168	1.54	75	1.09	37		
31	XX	XXX	1.39	61	XXX	XXX	1.46	67	1.06	35	XX	XXX
Total				1006.8		4747		3602		1615		779.3
Mean												
Second-feet per square mile												
Runoff, depth in inches												
Total acre-feet				1,996		9,420		7,140		3,203		1545
Maximum												
Minimum												

Prepared under direction of E.J.Clifton. May, 1933.

* From Water Commissioner's records (no chart)

Other gage heights from charts.

Note:

1589

STATE OF COLORADO

Engineering Department

Daily gage height, in feet, and discharge, in second-feet, of SKY - LINE DITCH (discharge ditch, square miles, observer) River at Bristol Gage read to Automatic Rating Flume ~~Rating Table~~ Continuous for year ending September 30, 19 28

Prepared under the direction of H. J. Sipton. MAY, 1928
All gage heights from charts.

Note.

Day	OCT. Gage height	OCT. Discharge	NOV. Gage height	NOV. Discharge	DEC. Gage height	DEC. Discharge	JAN. Gage height	JAN. Discharge	FEB. Gage height	FEB. Discharge	MAR. Gage height	MAR. Discharge	Day	APR. Gage height	APR. Discharge	MAY. Gage height	MAY. Discharge	JUNE. Gage height	JUNE. Discharge	JULY. Gage height	JULY. Discharge	AUG. Gage height	AUG. Discharge	SEPT. Gage height	SEPT. Discharge	Day
1													1							2.30	168	1.37	92	0.98	29	1
2													2							2.29	166	1.61	90	0.92	26	2
3													3							2.29	166	1.56	77	0.89	23	3
4													4							2.31	170	1.53	74	0.87	22	4
5													5					8 hrs 0.98	10	2.30	168	1.43	65	0.88	23	5
6													6					0.99	29	2.30	168	1.36	60	0.84	21	6
7													7					1.03	32	2.29	166	1.36	59	0.81	20	7
8													8					1.06	34	2.27	163	1.36	60	0.84	21	8
9													9					1.06	36	2.26	160	1.27	60	0.86	22	9
10													10			14½ hrs 0.86	18	1.07	36	2.27	163	1.29	61	0.88	20	10
11													11			0.88	20	1.09	37	2.28	165	1.36	60	0.90	24	11
12													12			0.93	26	1.14	41	2.26	162	1.29	61	0.81	20	12
13													13			0.90	24	1.21	55	2.26	162	1.26	60	0.76	17	13
14													14			0.81	20	1.43	66	2.27	163	1.34	59	0.79	19	14
15													15			0.78	18	1.63	84	2.26	162	1.33	56	0.78	17	15
16													16			0.82	20	1.87	110	2.27	163	1.29	56	0.70	14	16
17													17			0.76	15½ hrs 11	1.94	118	2.26	162	1.29	53	0.68	14	17
18													18					1.70	91	2.26	162	1.28	52	0.70	14	18
19													19			10 hrs 1.00	12	1.80	102	2.21	154	1.24	49	0.71	15	19
20													20			1.00	30	1.77	99	2.12	141	1.20	46	0.77	18	20
21													21			1.10	38	1.84	106	2.06	133	1.20	46	0.66	14	21
22													22			1.22	56	2.05	132	2.06	133	1.18	44	0.61	8½ hrs 4.8	22
23													23			1.41	68	2.16	149	2.03	129	1.16	43			23
24													24			1.56	77	2.19	151	1.87	110	1.11	39			24
25													25			1.66	87	2.21	154	1.80	102	1.06	36			25
26													26			1.83	104	2.25	157	1.79	101	1.10	38			26
27													27			1.80	15½ hrs 79	2.29	166	1.80	102	1.09	37			27
28													28					2.25	160	1.84	106	1.06	30			28
29													29					2.19	151	1.77	99	0.99	29			29
30									XX	XXX			30					2.27	163	1.79	101	0.97	28			30
31			XX	XXX					XX	XXX			31	XX	XXX			XX	XXX	1.74	96	0.98	29	XX	XXX	Year period
Total																	703		2467		4465		1649		416.8	9,700
Mean																										
Sec.-ft. per square mile																										
Run-off, depth in inches																										
Run-off in acre-feet																	1396		4890		8860		3270		825	19,240
Maximum																										
Minimum																										

C. E. Hodgson, E. Hardware, May 10, 1928

C. E. Hodgson, E. Hardware, May 9, 1928

C. E. Hodgson, E. Hardware, May 9, 1928

3166

1590

STATE OF COLORADO

Engineering Department

Daily gage height, in feet, and discharge, in second-feet, of SKY-LINE DITCH

Drainage area ... square miles. (Measured) Gage read to ...

River at or near Bristol Rating Flume

Automatic gage continuous

for year ending September 30, 19 29

Day	OCT. Gage height	OCT. Discharge	NOV. Gage height	NOV. Discharge	DEC. Gage height	DEC. Discharge	JAN. Gage height	JAN. Discharge	FEB. Gage height	FEB. Discharge	MAR. Gage height	MAR. Discharge	APR. Gage height	APR. Discharge	MAY Gage height	MAY Discharge	JUNE Gage height	JUNE Discharge	JULY Gage height	JULY Discharge	AUG. Gage height	AUG. Discharge	SEPT. Gage height	SEPT. Discharge	Day
1																	1.59	60	2.45	171	1.90	107	1.08	38	1
2																	1.52	71	2.43	169	1.86	105	1.15	43	2
3																	1.54	72	2.40	165	1.84	101	1.29	52	3
4																	1.62	80	2.37	161	1.82	100	1.47	67	4
5																	1.75	92	2.36	160	1.81	98	1.55	55	5
6																	1.87	104	2.39	164	1.93	110	1.31	54	6
7																	1.93	110	2.43	169	1.81	99	1.30	53	7
8																	2.09	128	2.41	166	1.66	83	1.19	45	8
9																	2.16	136	2.36	160	1.56	74	1.15	43	9
10																	2.19	140	2.33	157	1.56	74	1.14	42	10
11																	2.26	148	2.34	158	1.49	68	1.14	42	11
12																	2.18	139	2.31	154	1.39	60	1.10	39	12
13																	2.14	134	2.33	157	1.38	59	1.13	41	13
14															10hrs		2.20	141	2.35	159	1.34	56	1.22	47	14
15															0.72	7.4	2.29	152	2.32	155	1.30	53	1.19	45	15
16															0.74	19.0	2.30	153	2.34	158	1.28	52	1.12	40	16
17															0.81	22	2.35	157	2.19	140	1.40	61	1.16	43	17
18															0.90	26	2.19	140	2.01	119	1.47	67	1.14	42	18
19															0.90	26	2.19	140	2.01	119	1.47	67	1.14	42	19
20															0.92	27	2.08	127	2.21	142	1.45	65	1.11	40	20
21															1.02	34	2.12	131	2.25	147	1.36	58	1.11	40	21
22															1.07	37	2.22	145	2.19	140	1.29	52	1.15	43	22
23															0.94	28	2.37	161	2.13	135	1.31	54	1.19	45	23
24															0.89	26	2.38	163	2.10	129	1.21	47	1.21	47	24
25															1.20	46	2.40	165	2.09	128	1.21	47	1.21	47	25
26															1.49	68	2.42	167	2.07	126	1.17	44	1.16	45	26
27															1.48	67	2.42	169	2.06	125	1.11	40	18hrs 0.91	20	27
28															1.17	44	2.42	169	2.07	126	1.12	41			28
29															1.15	43	2.45	171	1.96	114	1.19	45			29
30									XX	XXX					1.05	34	2.50	177	1.88	105	1.14	42			30
31			XX	XXX					XX	XXX			XX	XXX	0.76	19	2.48	175	1.76	93	1.14	42			31
Total															1.17	44	XX	XXX	1.86	102	1.18	40	XX	XXX	Mean per month
																617.4		4078		4452		2039		1158	12,344
																1,225		8,090		8,833		4,045		2,297	24,490

Prepared under the direction of R. J. Tipton. May, 1925

All gage heights from charts.

Note:—

Chief of Party: P. C. Hart, T. Hawthorne, May 10, 1925

Computed by: P. C. Hart, T. Hawthorne, May 10, 1925

Checked by: P. C. Hart, T. Hawthorne, May 10, 1925

Quarter: 1st, 2nd, 3rd, 4th

Date: May 10, 1925

3167

STATE OF COLORADO Engineering Department

Daily gage height, in feet, and discharge, in second-feet, of SKY - LINE DITCH **River** at mouth **Rating Flume** **for year ending September 30, 19 30**

Drainage area ____ square miles. (observer.) Gage read by Bristol Automatic XXXXXXX continuous

Day	OCT. Gage height	OCT. Discharge	NOV. Gage height	NOV. Discharge	DEC. Gage height	DEC. Discharge	JAN. Gage height	JAN. Discharge	FEB. Gage height	FEB. Discharge	MAR. Gage height	MAR. Discharge	APR. Gage height	APR. Discharge	MAY Gage height	MAY Discharge	JUNE Gage height	JUNE Discharge	JULY Gage height	JULY Discharge	AUG. Gage height	AUG. Discharge	SEPT. Gage height	SEPT. Discharge	Day
1															0.82	22	2.07	118	1.85	94	1.42	55	0.93	26	1
2															1.00	30	1.72	92	1.82	92	1.38	53	0.90	25	2
3															1.02	31	1.64	74	1.82	91	1.26	51	0.90	25	3
4															0.84	25	1.62	72	1.78	87	1.44	57	0.91	26	4
5															0.79	21	1.47	59	1.77	86	1.32	53	0.97	29	5
6															0.78	19	1.66	74	1.70	79	1.39	53	0.95	28	6
7															0.73	18	1.96	106	1.68	77	1.34e	50	0.94	27	7
8															0.64	16	2.11	122	1.69	78	1.34e	50	0.91	26	8
9															0.61	14	2.18	131	1.72	81	1.44	57	0.90	25	9
10															0.61	14	2.28	143	1.74	82	1.28	52	0.89	25	10
11															0.57	12	2.33	149	1.71	80	1.22e	48	0.85	23	11
12															0.51	10	2.40	157	1.74	83	1.26	51	0.80	21	12
13															0.54	11	2.41	158	1.94	103	1.52	63	0.80	21	13
14															0.56	12	2.36	152	1.66e	75	1.80	89	0.79	21	14
15															0.62	14	2.30	145	1.62	72	1.78	87	0.74	19	15
16															0.68	15	2.28	143	1.56	66	1.71	80	0.72	18	16
17															0.68	16	2.36	152	1.53	64	1.63	73	0.71	17	17
18															0.62	15	2.33	149	1.54	65	1.50	61	0.69	17	18
19															0.66	16	2.22	138	1.68	77	1.41	55	0.66	16	19
20															0.76	19	2.26	152	1.63	73	1.36	50	0.68	16	20
21													0.54	10 (Hand) 4.6	1.11	36	2.39	156	1.56	66	1.26	45	0.46	9 8.8	21
22													0.57	12	1.17	39	2.43	161	1.43	56	1.20	41	0.18	0.8	22
23													0.78	20	0.99	30	2.36e	152	1.40	54	1.16	39			23
24													0.89	25	0.98	29	2.25e	139	1.45	56	1.16	38			24
25													0.82	22	1.07	34	2.11	122	1.37	52	1.08	34			25
26													0.76	19	1.27	45	2.04	114	1.34	50	1.11	36			26
27													0.69	17	1.69	69	2.02	112	1.30	47	1.19	40			27
28													0.66	16	1.78	82	1.96	104	1.36	51	1.11	36			28
29													0.61	14	1.87	96	1.88	97	1.45	58	1.01	34			29
30									XX	XXX			0.76	19	1.96	106	1.86	95	1.45e	58	1.02	31			30
31			XX	XXX					XX	XXX			XX	XXX	2.13	125	XX	XXX	1.39	55	0.99	30	XX	XXX	31
TOTAL														168.6		1038		3725		2209		1593		460.6	9,194.
Mean																									
Sec.-ft. per square mile																									
Run-off, depth in inches																									
Run-off in acre-feet														335		2,060		7,390		4,380		3,160		914	18,239
Maximum																									
Minimum																									

NOTE:— prepared under direction of R. J. Tipton May, 1933

All gage heights from charts.

1st qtr: C. E. McGraw, E. Eberhorse, May 11, 1933

2nd qtr: C. E. McGraw, E. Eberhorse, May 11, 1933

3rd qtr: C. E. McGraw, E. Eberhorse, May 11, 1933

4th qtr: C. E. McGraw, E. Eberhorse, May 11, 1933

STATE OF COLORADO

Engineering Department

Daily gage height, in feet, and discharge, in second-feet, of SKY-LINE DITCH River at Rating Flume for year ending October 13, 19 31

Drainage area ... square miles. (... observer.) Gage read by Bristol Automatic ~~ELEEK~~ Continuous

Day	OCT. 1932 Gage height	OCT. 1932 Discharge	NOV. Gage height	NOV. Discharge	DEC. Gage height	DEC. Discharge	JAN. Gage height	JAN. Discharge	FEB. Gage height	FEB. Discharge	MAR. Gage height	MAR. Discharge	Day	APR. Gage height	APR. Discharge	MAY Gage height	MAY Discharge	JUNE Gage height	JUNE Discharge	JULY Gage height	JULY Discharge	AUG. Gage height	AUG. Discharge	SEPT. Gage height	SEPT. Discharge	Day
1	0.59	12											1					1.70	76	1.89	94	1.25	40	0.65	14	1
2	0.59	12											2			14hrs 0.26	1	1.91	96	1.76	80	1.07	32	0.64	13	2
3	0.67	14											3			0.25	2	2.01	107	1.72	79	0.98	27	0.55	10	3
4	0.62	12											4			0.23	2	2.08	116	1.75	80	0.93	24	0.51	9	4
5	0.61	12											5			0.24	2	2.12	122	1.66	64	0.91	24	0.52	10	5
6	0.69	15											6			0.27	2	2.15	126	1.50	59	0.88	22	0.52	10	6
7	0.70	15											7			0.25	2	2.29	145	1.42	54	0.85	21	0.50	9	7
8	0.62	12											8			0.26	2	2.25	139	1.36	51	0.84	21	0.50	9	8
9	0.58	11											9			0.31	3	2.24	152	1.33	47	0.79	19	0.50	9	9
10	0.62	12											10			0.30	3	2.18	129	1.30	45	0.74	17	0.48	8	10
11	0.26	5											11			0.28	3	2.26	140	1.30	45	0.72	16	0.49	9	11
12	0.64	13											12			0.33	4	2.18	129	1.29	44	0.72	16	0.48	8	12
13	16hrs 0.52	6											13			0.44	7	2.26	140	1.26	42	0.69	15	0.49	9	13
14													14			0.47	8	2.21	147	1.21	39	0.66	14	0.45	8	14
15													15			0.89	23	2.22	135	1.20	38	0.72	16	0.59	12	15
16													16			1.22	40	2.36	154	1.20	38	0.74	17	0.54	10	16
17													17			1.26	51	2.22	149	1.17	36	0.69	15	0.49	9	17
18													18			1.17	36	2.26	140	1.18	36	0.70	15	0.64	13	18
19													19	16hrs 0.50	6	0.86	21	2.22	135	1.08	32	0.72	16	0.68	14	19
20													20	0.49	9	0.72	16	2.19	131	1.05	30	0.71	15	0.68	13	20
21													21	21hrs 0.48	7	0.63	13	2.16	126	1.01	28	0.66	14	0.54	10.	21
22													22			0.69	12	2.08	116	0.98	27	0.67	14	0.53	10	22
23													23			0.72	16	2.08	116	0.97	26	0.72	16	0.53	10	23
24													24			0.99	28	2.07	115	0.97	26	0.68	14	1.02	30	24
25													25			1.27	43	2.08	116	0.96	26	0.63	13	0.73	16	25
26													26			1.52	61	2.21	133	0.97	26	0.62	13	0.70	15	26
27													27			1.55	63	2.20	146	0.93	24	0.58	11	0.68	14	27
28													28			1.24	48	2.19	131	0.99	28	0.57	11	0.64	13	28
29													29			1.13	34	2.06	116	1.11	34	0.58	11	0.61	12	29
30									XX	XXX			30			1.20	38	2.06	114	1.00	28	0.53	10	0.64	13	30
31			XX	XXX					XX	XXX			31	A	XXX	1.48	68	XX	XXX	1.17	36	0.66	11	XX	XXX	31
Total		154													22		642		2837		1242		840		849		6886
Mean																											
Sec.-ft. per Sq. Mile																											
Runoff in depth in inches																											
Runoff in acre-feet		305													44		1,270		7,620		2,660		1,070		690		13,669
Maximum																											
Minimum																											

Note:— Prepared under the direction of E. J. Tipton May, 1933.
All gage heights from charts.

Burgess C. E. McGraw May 10, 1933.

STATE OF COLORADO

Engineering Department

Daily gage height, in feet, and discharge, in second-feet, of SKY-LINE DITCH

Drainage area ____ square miles. (____ , observer.) Gage read by Bristol Automatic

River at or near Rating Flume

for year ending September 30, 19 32

Continuous

Day	OCT. Gage height	OCT. Discharge	NOV. Gage height	NOV. Discharge	DEC. Gage height	DEC. Discharge	JAN. Gage height	JAN. Discharge	FEB. Gage height	FEB. Discharge	MAR. Gage height	MAR. Discharge	APR. Gage height	APR. Discharge	MAY Gage height	MAY Discharge	JUNE Gage height	JUNE Discharge	JULY Gage height	JULY Discharge	AUG. Gage height	AUG. Discharge	SEPT. Gage height	SEPT. Discharge	Day
1																	1.42	53	2.55	183	1.68	74			1
2																	1.26	49	2.04	181	1.64	62			2
3																	1.39	51	2.58	182	1.42	58			3
4																	1.51	60	2.51	177	1.41	52			4
5																	1.70	83	2.48	172	1.24	48			5
6																	1.80	85	2.40	160	1.20	45			6
7																	1.90	98	2.27	156	1.26	42			7
8																	1.90	95	2.54	182	1.22	40			8
9																	1.72	78	2.21	147	1.20	39			9
10															17 hrs		1.60	67	2.26	154	1.21	40 hrs 39			10
11															0.61	8.5	1.90	95	2.48	163					11
12															0.62	13	1.97	103	2.47	170					12
13															0.74	17	2.01	107	2.29	159					13
14															0.82	20	2.11	120	2.29	148					14
15															0.98	27	2.26	140	2.16	127					15
16															1.14	35	2.27	156	2.10	119					16
17															1.16	36	2.29	159	2.06	114					17
18															1.20	38	2.24	156	2.06	112					18
19															1.24	40	2.22	149	2.04	111	1.06	6 hrs 0.2			19
20															1.44	55	2.45	168	2.00	106	1.10	33			20
21															1.58	65	2.49	172	1.90	95	1.12	34			21
22															1.65	71	2.52	178	1.80	85	1.06	31			22
23															1.66	72	2.56	184	1.74	80	0.82	20			23
24															1.55	63	2.52	178	1.72	79	0.24	2			24
25															1.20	38	2.54	181	1.72	78					25
26															1.22	46	2.56	184	1.65	71					26
27															1.16	36	2.54	181	1.63	70					27
28															1.12	36	1.66	72	1.58	68					28
29															1.27	48	2.57	185	1.62	69					29
30									XX	XXX					1.42	55	2.56	184	1.69	78					30
31			XX	XXX					XX	XXX			XX	XXX	1.42	55	XX	XXX	1.75	80			XX	XXX	31
Total																872.5		8761		8839		608.2			
Mean																									
Sec.-ft. per square mile																									
Run-off, depth in inches																1.730		7.440		7.620		1205.			17.995
Run-off in acre-feet																									
Maximum																									
Minimum																									

Year period

Dec. 4th quarter: Prism applied [illegible]; Prism checked [illegible]; Date [illegible]

3rd quarter: Prism applied L. V. Burgess; Prism checked C. H. McCrea; Date July 20, 1932

2nd quarter: Prism applied L. V. Burgess; Prism checked C. H. McCrea; Date July 20, 1932

1st quarter: Prism applied L. V. Burgess; Prism checked C. H. McCrea; Date July 20, 1932

Note.— Prepared under the direction of R. J. Tipton, Dec. 1932.
All gage heights from charts.

3170

DEFENDANT'S EXHIBIT B-3

STATE OF COLORADO

Engineering Department

Daily gage height, in feet, and discharge, in second-feet, of SAND CREEK DITCH at Rating Flume for year ending September 30, 19 23

Drainage area ____ square miles. ____, observer]

Gage read to Bristol Automatic Continuous

Day	OCT. Gage height	OCT. Discharge	NOV. Gage height	NOV. Discharge	DEC. Gage height	DEC. Discharge	JAN. Gage height	JAN. Discharge	FEB. Gage height	FEB. Discharge	MAR. Gage height	MAR. Discharge	APR. Gage height	APR. Discharge	MAY. Gage height	MAY. Discharge	JUNE. Gage height	JUNE. Discharge	JULY. Gage height	JULY. Discharge	AUG. Gage height	AUG. Discharge	SEPT. Gage height	SEPT. Discharge
1																	2.75	104	1.05	19				
2																	2.73	103	0.98	16				
3																	2.70	101	0.96	17				
4																	2.74	103	0.88	13				
5																	2.57	93	0.58	8.1				
6																	2.67	98	0.39	4.8				
7																	2.53	91	0.33	3.9				
8																	2.60*	95	0.48	6.4				
9																	2.39	84	0.80	31 hrs 1.0				
10																	1.08	20						
11																	1.24	26						
12																	1.66	41						
13																	1.61	44						
14																	1.70	48						
15																	1.88	57						
16																	1.98	62						
17																	2.11	69						
18																	2.36	82						
19															0.52	12 hrs 2.5	2.46	92						
20															0.66	9.5	2.24	75						
21															0.76	12	2.05	66						
22															0.76	12	2.03*	64						
23															0.82	13	1.82	54						
24															1.02	19	1.74	50						
25															1.29	28	1.61	44						
26															1.63	44	1.64	45						
27															1.99	62	1.56	41						
28															1.98	62	1.44	(35)						
29															1.90	58	1.10	21						
30									XX	XXX					2.04	65	1.10	21						
31			XX	XXX					XX	XXX			XX	XXX	2.47	88	XX	XXX					XX	XXX
TOTAL																476.1		1924		89.2				
Mean																								
Second-feet per square mile																								
Run-off in inches																944		3,820		176				
Acre-feet																								
Maximum																								
Minimum																								

Day: 1st Quarter — Check applied ____ Check checked ____ Date ____ — 2nd Quarter — G N refund ____ G N checked ____ Date ____ — 3rd Quarter — Check applied C. E. McGraw, E. Barthorne 6/18/23 — Check checked ____ Date ____ — 4th Quarter — Check applied C. E. McGraw, E. Barthorne 6/18/23 — Check checked ____ Date ____ — 1st period — Check applied C. E. McGraw, E. Barthorne 6/18/23 — Check checked ____ Date ____ — 2nd period — Check applied ____ Check checked ____ Date ____ — Total — 2489 — 4,940

NOTE: Prepared under direction of B. J. Tipton, May, 1923.
*Gage height doubtful.
( ) From W.C.'s daily record. Other gage heights from charts.

STATE OF COLORADO

Engineering Department

Daily gage height, in feet, and discharge, in second-feet, of SAND CREEK DITCH River at Rating Flume for year ending September 30, 1924

Drainage area ... square miles (... observer) Gage read by Bristol Automatic ~~[illegible]~~ Continuous

Day	OCT. Gage height	OCT. Discharge	NOV. Gage height	NOV. Discharge	DEC. Gage height	DEC. Discharge	JAN. Gage height	JAN. Discharge	FEB. Gage height	FEB. Discharge	MAR. Gage height	MAR. Discharge	Day	APR. Gage height	APR. Discharge	MAY Gage height	MAY Discharge	JUNE Gage height	JUNE Discharge	JULY Gage height	JULY Discharge	AUG. Gage height	AUG. Discharge	SEPT. Gage height	SEPT. Discharge	Day
1													1					1.28	28							
2													2					1.34	30							
3													3					1.54	40							
4													4					2.12	70							
5													5					2.28	77							
6													6					2.68	100							
7													7					2.72	103							
8													8					2.52	8 hrs 30							
9													9													
10													10													
11													11													
12													12													
13													13													
14													14													
15													15													
16													16													
17													17													
18													18													
19													19													
20													20													
21													21			1.99	9 hrs 24									
22													22			1.91	59									
23													23			1.79	53									
24													24			1.69	48									
25													25			1.29	28									
26													26			1.30	29									
27													27			1.66	46									
28													28			1.54	40									
29													29			1.41	33									
30									XX	XXX			30			1.31	29									
31			XX	XXX					XX	XXX			31	XX	XXX	1.26	27	XX	XXX					XX	XXX	
TOTAL																416		478								
Mean																										
Sec.-ft. per square mile																										
Run-off, depth in inches																										
Run-off in acre-feet																825		948								
Maximum																										
Minimum																										

NOTE.— Prepared under the direction of R. J. Tipton, May, 1923.
All Gage Heights from charts.

F. O. Hart
T. Hawthorne
8/17/24

F. O. Hart
T. Hawthorne
8/17/24

F. O. Hart
T. Hawthorne
8/17/24

STATE OF COLORADO

Engineering Department

Daily gage height, in feet, and discharge, in second-feet, of SAND CREEK DITCH River at near Rating Flume for year ending September 30, 19 25

Drainage area square miles (acres) Gage read to Bristol Automatic ~~[illegible]~~ Continuous

Day	OCT. Gage height	OCT. Discharge	NOV. Gage height	NOV. Discharge	DEC. Gage height	DEC. Discharge	JAN. Gage height	JAN. Discharge	FEB. Gage height	FEB. Discharge	MAR. Gage height	MAR. Discharge	Day	APR. Gage height	APR. Discharge	MAY Gage height	MAY Discharge	JUNE Gage height	JUNE Discharge	JULY Gage height	JULY Discharge	AUG. Gage height	AUG. Discharge	SEPT. Gage height	SEPT. Discharge	Day
1													1			1.00	18*	1.87	56							1
2													2			1.00	18*	1.71	48							2
3													3			1.00	18*	1.53	39							3
4													4			1.20	24*	1.50	38							4
5													5			1.20	24*	1.85	56							5
6													6			1.13	22	1.89	58							6
7													7			1.08	20	1.73	50							7
8													8			1.21	25	1.81	54							8
9													9			1.35	31	1.55	40							9
10													10			1.38	32	1.46	36							10
11													11			1.30	29	1.40	33							11
12													12			1.34	30	1.33	30							12
13													13			1.54	40	1.20	24							13
14													14			1.44	35	1.17	23							14
15													15			1.11	21	1.23	26							15
16													16			1.29	28	1.10	21							16
17													17			1.83	54	0.98	17							17
18													18			1.92	59	0.96	17							18
19													19			1.82	54	0.88	14							19
20													20			1.95	60	0.99	18							20
21													21			2.14	70		9.0*							21
22													22			2.09	68		9.0*							22
23													23			2.04	65		9.0*							23
24													24			2.05	66		9.0*							24
25													25			2.04	65		9.0*							25
26													26			1.92	59		9.0*							26
27													27			1.94	60		9.0*							27
28													28			2.02	64									28
29													29			2.03	64									29
30									\\	\\\			30	1.0	18*	1.98	62									30
31			\\	\\\					\\	\\\			31	\\	\\\	1.94	60	\\	\\\					\\	\\\	31
Total															18		1345		761							[illegible]
Mean																										
Sec. ft. per sq. mile																										
Rainfall, depth																										
Sec. ft. per sq. mile															36		2,670		1,510							[illegible]

Note: Prepared under the direction of R. J. Tipton, May, 1933.
*From records of Water Commissioner.
Other gage heights from charts.

C. E. McGraw
T. Hawthorne
5/17/33

C. E. McGraw
T. Hawthorne
5/17/33

C. E. McGraw
T. Hawthorne
5/17/33

STATE OF COLORADO

Engineering Department

Daily gage height, in feet, and discharge, in second-feet, of SAND CREEK DITCH River at mouth Rating Flume for year ending September 30, 19 26

Drainage area ____ square miles. (Above/below) ____ gage read to Bristol Automatic Continuous

Day	OCT. Gage height	OCT. Discharge	NOV. Gage height	NOV. Discharge	DEC. Gage height	DEC. Discharge	JAN. Gage height	JAN. Discharge	FEB. Gage height	FEB. Discharge	MAR. Gage height	MAR. Discharge	Day	APR. Gage height	APR. Discharge	MAY. Gage height	MAY. Discharge	JUNE. Gage height	JUNE. Discharge	JULY. Gage height	JULY. Discharge	AUG. Gage height	AUG. Discharge	SEPT. Gage height	SEPT. Discharge	Day
1													1					2.04	65							1
2													2					1.74	14 hrs 29							2
3													3													3
4													4													4
5													5													5
6													6													6
7													7													7
8													8													8
9													9													9
10													10													10
11													11													11
12													12													12
13													13													13
14													14													14
15													15													15
16													16													16
17													17													17
18													18			1.06	12 hrs 10									18
19													19			1.13	22									19
20													20			1.45	26									20
21													21			1.96	61									21
22													22			2.48	88									22
23													23			2.94	116									23
24													24			3.08	124									24
25													25			3.06	123									25
26													26			3.05	122									26
27													27			2.92	114									27
28													28			2.66	99									28
29													29			2.68	94									29
30									XX	XXX			30			2.62	91									30
31			XX	XXX					XX	XXX			31	XX	XXX	2.78	106	XX	XXX					XX	XXX	31
Total																	1204		94							
Mean																										1298
Sec.-ft. per square mile																										
Runoff, depth in inches																										
Runoff in acre feet																	2,390		186							2,576
Maximum																										
Minimum																										

Quarter: 1st 2nd 3rd 4th — Completed ____ Checked ____ Date

P. C. Hart
T. Hartborne
5/17/33

Prepared under the direction of R. J. Tipton, May, 1933.
All gage heights from charts.

Note:

STATE OF COLORADO

Engineering Department

Daily gage height, in feet, and discharge, in second-feet, of SAND CREEK DITCH **River** at Rating Flume **for year ending September 30, 19** 27

Drainage area ____ square miles. (Location.) Gage read by Bristol Automatic Continuous

Day	OCT. Gage height	OCT. Discharge	NOV. Gage height	NOV. Discharge	DEC. Gage height	DEC. Discharge	JAN. Gage height	JAN. Discharge	FEB. Gage height	FEB. Discharge	MAR. Gage height	MAR. Discharge	Day	APR. Gage height	APR. Discharge	MAY. Gage height	MAY. Discharge	JUNE. Gage height	JUNE. Discharge	JULY. Gage height	JULY. Discharge	AUG. Gage height	AUG. Discharge	SEPT. Gage height	SEPT. Discharge	Day
1													1					1.69	48	0.66	9.7					1
2													2					1.66	46	0.66	7.8					2
3													3					1.69	48	0.56	7.6					3
4													4					1.62	44	0.62	7.1					4
5													5					1.71	48	0.51	6.9					5
6													6					1.60	42	0.49	6.6					6
7													7					1.61	44	0.48	6.4					7
8													8					1.81	54	0.45	5.9					8
9													9					1.77	52	0.45	5.9					9
10													10					1.68	47	0.50	6.7					10
11													11					1.56	41	0.49	6.6					11
12													12					1.46	36	0.44	5.7					12
13													13					1.40	32	0.41	5.2					13
14													14					1.51	38	0.37	4.5					14
15													15					1.91	58	0.26	4.4					15
16													16					1.36	31	0.38	4.7					16
17													17					1.30	28	0.29	4.8					17
18													18					1.21	25	0.22	3.9					18
19													19			10 hrs				8 hrs							19
20													20			1.64	17	1.12	22	0.30	1.1					20
21													21			1.66	46	1.04	19							21
22													22			1.99	62	0.92	16							22
23													23			2.14	70	0.90	15							23
24													24			1.84	55	0.81	13							24
25													25			1.66	46	0.78	12							25
26													26			1.80	52	0.71	11							26
27													27			1.90	58	0.69	10							27
28													28			1.92	59	0.65	9.5							28
29													29			1.98	62	0.72	11							29
30													30			1.84	55	0.80	12							30
31			XX	XXX					XX	XXX			31	XX	XXX	1.68	47	0.76	12					XX	XXX	31
TOTAL																	676		926.5		111.2						1714
Mean																											
Sec.-ft. per square mile																											
Inches depth in area																											
Run-off in acre-feet																	1,340		1,840		220						2,400
Maximum																											
Minimum																											

Note.— Prepared under the direction of R. J. Tipton, May, 1933.
All gage heights from charts.

C. E. McGraw
E. Hawthorne
5/17/33

C. E. McGraw
E. Hawthorne
5/17/33

C. E. McGraw
E. Hawthorne
5/17/33

STATE OF COLORADO

Engineering Department

Daily gage height, in feet, and discharge, in second-feet, of SAND CREEK DITCH **River** at ... Rating Flume **for year ending September 30, 19** 28

Drainage area ... square miles. (observer.) Gage read by Bristol Automatic ~~Water~~ Continuous

Day	OCT. Gage height	OCT. Discharge	NOV. Gage height	NOV. Discharge	DEC. Gage height	DEC. Discharge	JAN. Gage height	JAN. Discharge	FEB. Gage height	FEB. Discharge	MAR. Gage height	MAR. Discharge	APR. Gage height	APR. Discharge	MAY. Gage height	MAY. Discharge	JUNE. Gage height	JUNE. Discharge	JULY. Gage height	JULY. Discharge	AUG. Gage height	AUG. Discharge	SEPT. Gage height	SEPT. Discharge
1																1								
2																								
3																								
4																								
5																								
6																								
7																								
8																								
9																								
10															1.24	93 / 10 hrs								
11															1.25	26								
12															1.23	26								
13															1.21	25								
14															0.95	16								
15															0.96	17								
16															0.94	16								
17															0.96	16								
18															0.91	15								
19															1.00	18								
20															1.14	22								
21															0.34	30								
22															1.67	46								
23															2.03	64								
24															2.20	73								
25															2.44	86								
26															2.57	93								
27															2.44	16 hrs 84								
28																								
29																								
30									XX	XXX														
31			XX	XXX					XX	XXX			XX	XXX			XX	XXX					XX	XXX
Total															653									
Mean																								
Sec.-ft. per sq. mi.																								
Run-off, depth in in. on																								
Run-off, acre-feet															1,295									
Maximum																								
Minimum																								

Day	4th Quarter	3rd Quarter	2nd Quarter	1st Quarter
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				
Year period				

Chained ... Checked ... Date ...

4th Quarter: Checked ... Date ...

3rd Quarter: Checked C. E. McGraw; Checked T. Hawthorne; Date 5/17/33

2nd Quarter: Checked C. E. McGraw; Checked T. Hawthorne; Date 5/17/33

1st Quarter: Checked C. E. McGraw; Checked T. Hawthorne; Date 5/17/33

NOTE: Prepared under the direction of R. J. Tipton, May, 1933.
All gage heights from charts.

3176

STATE OF COLORADO

Engineering Department

Daily gage height, in feet, and discharge, in second-feet, of SAND CREEK DITCH River at Rating Flume for year ending September 30, 19 29

Drainage area ... square miles ... (Diameter) Gage read by Bristol Automatic ~~XXXXXX~~ Continuous

Day	OCT. Gage height	OCT. Discharge	NOV. Gage height	NOV. Discharge	DEC. Gage height	DEC. Discharge	JAN. Gage height	JAN. Discharge	FEB. Gage height	FEB. Discharge	MAR. Gage height	MAR. Discharge	Day	APR. Gage height	APR. Discharge	MAY Gage height	MAY Discharge	JUNE Gage height	JUNE Discharge	JULY Gage height	JULY Discharge	AUG. Gage height	AUG. Discharge	SEPT. Gage height	SEPT. Discharge	Day
1													1					2.18	71	1.29	28					1
2													2					2.52	91	1.05	20					2
3													3					2.58	94	0.93	16					3
4													4					2.61	96	0.92	16					4
5													5					2.74	103	0.96	17					5
6													6					2.93	115	1.02	19					6
7													7					2.98	118	0.83	13					7
8													8					2.10	68	0.75	12					8
9													9					0.45	5.9	0.75	12					9
10													10					1.72	49	0.69	10					10
11													11					2.69	100	0.68	10					11
12													12					2.82	108	0.64	9.3					12
13													13					2.64	97	0.65	9.5					13
14													14					2.72	102	0.61	8.7					14
15													15					2.68	100	0.61	8.7					15
16													16					2.63	97	0.77	12					16
17													17					2.82	108	0.64	9.3					17
18													18					2.21	79	0.62	12 hrs 4.5					18
19													19					2.21	74							19
20													20					2.22	74							20
21													21					2.22	74							21
22													22					2.13	70							22
23													23					1.98	62							23
24													24					1.86	56							24
25													25			2.12	16 hrs 45	1.73	50							25
26													26			2.04	65	1.55	40							26
27													27			1.73	50	1.55	40							27
28													28			1.52	39	1.42	34							28
29													29			1.34	30	1.28	28							29
30													30			1.44	35	1.30	29							30
31													31			1.68	47									31
Total																	312		[illegible]		238					2780
																	619		4,430		466					5,515

Prepared under the direction of R. J. Tipton, May, 1933.
All gage heights from charts.

Quarter 1st 2nd 3rd 4th — Computed: F. C. Hart, Checked: T. Hawthorne, Date: 5/15/33

Quarter 1st 2nd 3rd 4th — Computed: F. C. Hart, Checked: T. Hawthorne, Date: 5/15/33

Quarter 1st 2nd 3rd 4th — Computed: F. C. Hart, Checked: T. Hawthorne, Date: 5/15/33

STATE OF COLORADO

Engineering Department

Daily gage height, in feet, and discharge, in second-feet, of SAND CREEK DITCH **River** at near Rating Flume **for year ending September 30, 19** 30

Drainage area _____ square miles _____ (_____ sheet) Gage read to Bristol Automatic ~~XXXXXX~~ Continuous

Day	OCT. Gage height	OCT. Discharge	NOV. Gage height	NOV. Discharge	DEC. Gage height	DEC. Discharge	JAN. Gage height	JAN. Discharge	FEB. Gage height	FEB. Discharge	MAR. Gage height	MAR. Discharge
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30									XX	XXX		
31			XX	XXX					XX	XXX		
Total												
Mean												
Sec.-ft. per square mile												
Run-off, depth in inches												
Run-off in acre-feet												
Maximum												
Minimum												

Day	APR. Gage height	APR. Discharge	MAY Gage height	MAY Discharge	JUNE Gage height	JUNE Discharge	JULY Gage height	JULY Discharge	AUG. Gage height	AUG. Discharge	SEPT. Gage height	SEPT. Discharge
1			0.81	13	1.98	62						
2			1.01	18	1.72	49						
3			0.89	15	1.63	45						
4			0.79	12	1.60	43						
5			0.71	11	1.62	44						
6			0.65	9.5	1.59	42						
7			0.60	8.5	1.62	44						
8			0.60	8.5	1.56	41						
9			0.59	8.3	1.43	34						
10			0.61	8.7	1.35	31						
11			0.51	6.9	1.29	28						
12			0.50	6.7	1.20	25						
13			0.45	5.9	1.10	21						
14			0.51	6.9	1.00	18						
15			0.63	9.1	0.96	17						
16			0.64	9.3	0.93	16						
17			0.62	8.9	0.88	15						
18			0.62	8.9	0.88	15						
19			0.76	12	0.84	14						
20			0.98	17	0.75	12						
21			1.87	56	0.74	11						
22			1.48	37	0.88	15						
23			1.21	25	0.59	8.3						
24			1.34	30	0.50e	6.7						
25			1.54	40								
26			1.70	48								
27			1.81	54								
28			1.91	59								
29			2.01	64								
30	0.60	15 hrs 5.3	2.20	73								
31	XX	XXX	2.23	75	XX	XXX					XX	XXX
Total		5.3		765.1		657						
Mean												
Sec.-ft. per square mile												
Run-off, depth in inches												
Run-off in acre-feet		10		1,520		1,300						
Maximum												
Minimum												

Day	Quarter	Computed	Checked	Date
1	1st	F. C. Hart	T. Hawthorne	5/16/33
2	2nd			
3	3rd			
4	4th			
5	1st			
6	2nd			
7	3rd			
8	4th			
9	1st	F. C. Hart	T. Hawthorne	5/16/33
10	2nd			
11	3rd			
12	4th			
13	1st			
14	2nd			
15	3rd			
16	4th			
17	1st	F. C. Hart	T. Hawthorne	5/16/33
18	2nd			
19	3rd			
20	4th			
21	1st	F. C. Hart	T. Hawthorne	5/16/33
22	2nd			
23	3rd			
24	4th			
25	1st			
26	2nd			
27	3rd			
28	4th			
29	1st			
30	2nd			
31	Year period			
Total				1427
Mean				
Sec.-ft. per square mile				
Run-off, depth in inches				
Run-off in acre-feet				2,830
Maximum				
Minimum				

NOTE.— Prepared under the direction of R. J. Tipton, May, 1933.
All gage heights from charts.
e. indicates gage heights partly estimated.

3178

STATE OF COLORADO

Engineering Department

Daily gage height, in feet, and discharge, in second-feet, of SAND CREEK DITCH **River** at Rating Flume **for year ending September 30, 19**[illegible]

Drainage area [illegible] square miles [illegible] (observer) Gage read to Bristol Automatic ~~[illegible]~~ Continuous

Day	OCT. Gage height	OCT. Discharge	NOV. Gage height	NOV. Discharge	DEC. Gage height	DEC. Discharge	JAN. Gage height	JAN. Discharge	FEB. Gage height	FEB. Discharge	MAR. Gage height	MAR. Discharge	Day	APR. Gage height	APR. Discharge	MAY Gage height	MAY Discharge	JUNE Gage height	JUNE Discharge	JULY Gage height	JULY Discharge	AUG. Gage height	AUG. Discharge	SEPT. Gage height	SEPT. Discharge
1													1					1.43	34						
2													2					1.52	39						
3													3					1.60	43						
4													4					1.63	45						
5													5					1.70	48						
6													6					1.56	40						
7													7					1.44	35						
8													8					1.34	30						
9													9					1.53	39						
10													10					1.55	40						
11													11					1.89	58						
12													12					1.27	27						
13													13					1.13	22						
14													14					1.03	19						
15													15					0.96	17						
16													16			0.97	17	0.87	14						
17													17			1.79	53	0.81	13						
18													18			1.45	36	0.72	11						
19													19			0.99	18	0.64	9.3						
20													20			0.75	12	0.63	9.1						
21													21			0.69	10	0.57	7.9						
22													22			0.80	13	0.53	7.2						
23													23			1.36	31	0.51	6.9						
24													24			1.67	47	0.50	6.7						
25													25			1.58	42	0.44	5.7						
26													26			1.55	40	0.47	6.2						
27													27			1.37	32	0.42	5.3						
28													28			1.28	29	0.41	[illegible]						
29													29			1.27	27								
30													30			1.24	26								
31													31			1.40	33								
Total																	464		640.6						

Note: Prepared under the direction of R. J. Tipton, May, 1933.
All gage heights from charts.

16883

STATE OF COLORADO

Engineering Department

Daily gage height, in feet, and discharge, in second feet, of SAND CREEK DITCH (Drainage area) (above) (overseer) Gage read to Bristol Automatic River at near Rating Flume ~~Gage~~ Continuous for year ending September 30, 1932

Day	OCT. Gage height	OCT. Discharge	NOV. Gage height	NOV. Discharge	DEC. Gage height	DEC. Discharge	JAN. Gage height	JAN. Discharge	FEB. Gage height	FEB. Discharge	MAR. Gage height	MAR. Discharge
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30									XX	XXX		
31			XX	XXX					XX	XXX		
Total												

Day	APR. Gage height	APR. Discharge	MAY. Gage height	MAY. Discharge	JUNE. Gage height	JUNE. Discharge	JULY. Gage height	JULY. Discharge	AUG. Gage height	AUG. Discharge	SEPT. Gage height	SEPT. Discharge	Day
1					1.96	61	0.78	12					1
2					1.92	59	0.90	15					2
3					2.02	64	0.96	17					3
4					2.13	70	0.66	9.6					4
5					2.20	72	0.57	8.0					5
6					2.19	73	0.63	7.2					6
7					2.30	79	0.43	6.6					7
8					2.24	75	0.33	3.9					8
9					2.20	73	0.28	3.1					9
10					2.10	68	0.28	8 Ors 1.0					10
11					2.07	67							11
12					2.02	64							12
13					2.04	66							13
14					2.07	67							14
15				13 hrs	0.98	9.4	2.17	72					15
16			0.98	17	2.11	69							16
17			1.09	21	1.96	61							17
18			1.32	29	1.82	54							18
19			1.49	37	1.72	49							19
20			1.56	56	1.91	69							20
21			2.09	68	1.68	39							21
22			2.61	96	1.43	34							22
23			2.26	82	1.32	29							23
24			2.16	71	1.26	27							24
25			1.97	62	1.17	23							25
26			1.70	48	1.11	21							26
27			1.54	40	1.19	24							27
28			1.55	40	1.10	21							28
29			1.94	60	0.93	16							29
30			2.08	67	0.81	12							30
31	XX	XXX	2.01	64	XX	XXX					XX	XXX	31
Total				867.4		1669		82.2					2519

DEFENDANT'S EXHIBIT C-3

STATE OF COLORADO

Engineering Department

Daily gage height, in feet, and discharge, in second-feet, of LOST LAKE DITCH River at near Outlet for year ending September 30, 19 23

Drainage area square miles. (, observer) Gage read to Automatic Register XXXXXX

Day	OCT. Gage height	OCT. Discharge	NOV. Gage height	NOV. Discharge	DEC. Gage height	DEC. Discharge	JAN. Gage height	JAN. Discharge	FEB. Gage height	FEB. Discharge	MAR. Gage height	MAR. Discharge	Day	APR. Gage height	APR. Discharge	MAY Gage height	MAY Discharge	JUNE Gage height	JUNE Discharge	JULY Gage height	JULY Discharge	AUG. Gage height	AUG. Discharge	SEPT. Gage height	SEPT. Discharge	Day	Quarter	Computed / Checked / Date
1													1									1.27	34.			1	3rd	F. C. Hart T. Hawthorne 6/16/33
2													2									1.29	36.			2	2nd	
3													3									1.27	34.			3		
4													4									1.23	33.			4	1st	
5													5									1.19	31.			5		
6													6									1.11	28.			6	Quarter	
7													7									0.88	20.			7		
8													8									0.38	5.6			8		
9													9									0.16	1.6			9	4th	
10													10									16 hours 0.11	0.6			10		
11													11													11	3rd	F. C. Hart T. Hawthorne 6/16/33
12													12													12		
13													13													13	2nd	
14													14													14		
15													15													15	1st	
16													16													16	Quarter	
17													17													17		
18													18													18		
19													19													19		
20													20													20	4th	
21													21													21	3rd	F. C. Hart T. Hawthorne 6/16/33
22													22													22		
23													23													23	2nd	
24													24													24		
25													25													25	1st	
26													26													26		
27													27													27	Quarter	
28													28													28		
29													29							17 hours 1.38	27.					29		
30									XX	XXX			30							1.31	26.					30		
31			XX	XXX					XX	XXX			31	XX	XXX			XX	XXX	1.27	24.			XX	XXX	31	Year period	
TOTAL																					97.		222.7				319.7	
Mean																												
Sec.-ft. per square mile																												
Run-off, depth in inches																												
Run-off in acre-feet																					192		442				634 A.-Ft.	
Maximum																												
Minimum																												

Note.— Prepared under the direction of R. J. Tipton, June, 1933.
All gage heights from charts.

STATE OF COLORADO

Engineering Department

Daily gage height, in feet, and discharge, in second-feet, of LOST LAKE DITCH River at near Outlet for year ending September 30, 1926

Drainage area square miles. Gage height from Automatic Register

Day	OCT. Gage height	OCT. Discharge	NOV. Gage height	NOV. Discharge	DEC. Gage height	DEC. Discharge	JAN. Gage height	JAN. Discharge	FEB. Gage height	FEB. Discharge	MAR. Gage height	MAR. Discharge	Day	APR. Gage height	APR. Discharge	MAY Gage height	MAY Discharge	JUNE Gage height	JUNE Discharge	JULY Gage height	JULY Discharge	AUG. Gage height	AUG. Discharge	SEPT. Gage height	SEPT. Discharge	Day
1													1					0.39	5.8			1.04	25.			1
2													2					0.28	3.5			1.02	25.			2
3													3					0.23	2.6			0.89	20.			3
4													4					16 hours 0.13	0.8			0.83	18.			4
5													5									0.88	18.			5
6													6									0.79	17.			6
7													7									0.67	13.1			7
8													8									0.37	5.4			8
9													9									0.19	2.0			9
10													10									0.13	1.1			10
11													11									16 hours 0.10	0.5			11
12													12													12
13													13													13
14													14													14
15													15													15
16													16													16
17													17													17
18													18													18
19													19													19
20													20													20
21													21			7 hours 0.61	5.0									21
22													22			0.80	17.									22
23													23			0.76	16.									23
24													24			0.52	9.0									24
25													25			0.35	5.0			5 hours 1.08	6.9					25
26													26			0.34	4.7			1.10	28.					26
27													27			0.35	5.0			1.08	27.					27
28													28			0.47	7.7			1.06	26.					28
29													29			0.68	12.4			1.07	26.					29
30									XX	XXX			30			0.67	13.1			1.11	28.					30
31			XX	XXX					XX	XXX			31	XX	XXX	0.61	11.4	XX	XXX	1.07	26.			XX	XXX	31
TOTAL																	107.3		12.7		169.9		145.1			475.0
Mean																										
Sec.-ft. per square mile																										
Run-off, depth in inches																										
Run-off in acre-feet																	213		25		337		288			863 A.-Ft.
Maximum																										
Minimum																										

Note. Prepared under the direction of R. J. Tipton, June, 1922.
All gage heights from charts.

F. C. Hart
T. Hawthorne
6/16/22

F. C. Hart
T. Hawthorne
6/16/22

F. C. Hart
T. Hawthorne
6/16/22

STATE OF COLORADO

Engineering Department

Daily gage height, in feet, and discharge, in second-feet, of LOST LAKE DITCH **River** at Outlet **for year ending September 30, 19**27

Drainage area ..... square miles ..... [..... observer.]

Gage read to Bristol Automatic [redacted] Continuous

Day	OCT. Gage height	OCT. Discharge	NOV. Gage height	NOV. Discharge	DEC. Gage height	DEC. Discharge	JAN. Gage height	JAN. Discharge	FEB. Gage height	FEB. Discharge	MAR. Gage height	MAR. Discharge	Day	APR. Gage height	APR. Discharge	MAY Gage height	MAY Discharge	JUNE Gage height	JUNE Discharge	JULY Gage height	JULY Discharge	AUG. Gage height	AUG. Discharge	SEPT. Gage height	SEPT. Discharge	Day
1													1													1
2													2													2
3													3													3
4													4													4
5													5													5
6													6													6
7													7													7
8													8													8
9													9													9
10													10													10
11													11									0.90	9 hrs 7.6			11
12													12									0.90	20.			12
13													13									0.90	20.			13
14													14									0.91	21.			14
15													15									0.92	21.			15
16													16									0.91	21.			16
17													17									0.91	21.			17
18													18									0.85	19.			18
19													19									0.81	17.			19
20													20									0.76	16.			20
21													21									0.86	19.			21
22													22									0.78	16.			22
23													23									0.41	6.2			23
24													24									0.20	2.1			24
25													25									0.11	0.9			25
26													26									16 hours 0.10	0.5			26
27													27													27
28													28													28
29													29													29
30									XX	XXX			30													30
31			XX	XXX					XX	XXX			31	XX	XXX			XX	XXX					XX	XXX	31
TOTAL																						228.4				228.4
Mean																										
Sec.-ft. per square mile																										
Run-off, depth in inches																										
Run-off in acre-feet																						454				454 A.F.
Maximum																										
Minimum																										

Note: Prepared under the direction of R. J. Tipton, May, 1933.
All gage heights from chart.

Quarter	Computed	Checked	Date
1st	T. Hawthorne	C. E. McGraw	5/17/33
2nd	T. Hawthorne	C. E. McGraw	5/17/33
3rd	T. Hawthorne	C. E. McGraw	5/17/33
4th			
Year period			

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STATE OF COLORADO

Engineering Department

Daily gage height, in feet, and discharge, in second-feet, of LOST LAKE DITCH **River** at near Outlet **for year ending September 30, 19** 28

Drainage area ... Gage read to Automatic Register

Dep.	OCT. Gage height	OCT. Discharge	NOV. Gage height	NOV. Discharge	DEC. Gage height	DEC. Discharge	JAN. Gage height	JAN. Discharge	FEB. Gage height	FEB. Discharge	MAR. Gage height	MAR. Discharge	Dep.	APR. Gage height	APR. Discharge	MAY Gage height	MAY Discharge	JUNE Gage height	JUNE Discharge	JULY Gage height	JULY Discharge	AUG. Gage height	AUG. Discharge	SEPT. Gage height	SEPT. Discharge	Dep.
1													1													1
2													2													2
3													3													3
4													4													4
5													5													5
6													6													6
7													7													7
8													8													8
9													9													9
10													10													10
11													11									11 hours 0.80	7.8			11
12													12									0.80	17.			12
13													13									0.83	18.			13
14													14									0.81	17.			14
15													15									0.80	17.			15
16													16									0.80	17.			16
17													17									0.80	17.			17
18													18									0.80	17.			18
19													19									0.79	17.			19
20													20									0.79	17.			20
21													21									0.79	17.			21
22													22									0.78	16.			22
23													23									0.63	9.2			23
24													24									0.21	2.3			24
25													25									16 hours 0.16	1.0			25
26													26													26
27													27													27
28													28													28
29													29													29
30									XX	XXX			30													30
31			XX	XXX					XX	XXX			31	XX	XXX			XX	XXX					XX	XXX	31
Total																						207.3				207.3
Mean																										
Sec.-ft. per square mile																										
Run-off, depth in inches																										
Run-off in acre-feet																						411				411
Maximum																										
Minimum																										

Note.— Prepared under the direction of R. J. Tipton, June, 1922.
All gage heights from charts.

Dep.	4th	3rd	2nd	1st	Quarter	Computed / Checked / Date
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						
31						
Mean period						

Quarter	Computed / Checked / Date
1st	F. C. Hart / T. Hawthorne / 6/16/23
2nd	F. C. Hart / T. Hawthorne / 6/16/23
3rd	F. C. Hart / T. Hawthorne / 6/16/23
4th	F. C. Hart / T. Hawthorne / 6/16/23

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STATE OF COLORADO

Engineering Department

Daily gage height, in feet, and discharge, in second-feet, of LOST LAKE DITCH River Outlet for year ending September 30, 19 29

Drainage area ... square miles ... (measured) Gage read to Bristol Automatic Continuous

Day	OCT. Gage height	OCT. Discharge	NOV. Gage height	NOV. Discharge	DEC. Gage height	DEC. Discharge	JAN. Gage height	JAN. Discharge	FEB. Gage height	FEB. Discharge	MAR. Gage height	MAR. Discharge	APR. Gage height	APR. Discharge	MAY. Gage height	MAY. Discharge	JUNE. Gage height	JUNE. Discharge	JULY. Gage height	JULY. Discharge	AUG. Gage height	AUG. Discharge	SEPT. Gage height	SEPT. Discharge
1																								
2																								
3																								
4																								
5																								
6																								
7																								
8																					0.92	15 hrs 14.5		
9																					0.90	20.2		
10																					0.89	20.1		
11																					0.86	19.0		
12																					0.83	18.0		
13																					0.83	18.0		
14																					0.80	17.2		
15																					0.80	17.1		
16																					0.77	16.1		
17																					0.74	15.2		
18																					0.71	14.2		
19																					0.70	14.0		
20																					0.70	14.0		
21																					0.69	13.7		
22																					0.38	4.6		
23																					0.17	16 hrs 1.1		
24																								
25																								
26																								
27																								
28																								
29																								
30																								
31																								
Total																					226.7			
Mean																								
Max.																					670			
Min.																								

Note: Prepared under the direction of [illegible] Tipton, Dec. 1933.
All gage heights from charts.

Quarter: 1st 2nd 3rd 4th — Computed: C. H. McGraw 5/17/33 — Checked: H. Hawthorne 5/17/33

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STATE OF COLORADO

Engineering Department

Daily gage height, in feet, and discharge, in second-feet, of LOST LAKE DITCH River at near Outlet for year ending September 30, 19 30

Drainage area ... square miles ... [observer] ... Gage height by Bristol Automatic ~~XXXXX~~ Continuous

Day	OCT. Gage height	OCT. Discharge	NOV. Gage height	NOV. Discharge	DEC. Gage height	DEC. Discharge	JAN. Gage height	JAN. Discharge	FEB. Gage height	FEB. Discharge	MAR. Gage height	MAR. Discharge	Day	APR. Gage height	APR. Discharge	MAY Gage height	MAY Discharge	JUNE Gage height	JUNE Discharge	JULY Gage height	JULY Discharge	AUG. Gage height	AUG. Discharge	SEPT. Gage height	SEPT. Discharge	Day
1													1									0.46	7.4			1
2													2									0.15	1.4			2
3													3									0.08	16 hrs 0.3			3
4													4													4
5													5													5
6													6													6
7													7													7
8													8													8
9													9													9
10													10													10
11													11													11
12													12													12
13													13													13
14													14													14
15													15													15
16													16													16
17													17													17
18													18													18
19													19													19
20													20													20
21													21													21
22													22													22
23													23													23
24													24							0.70	16 hrs 9.3					24
25													25							0.70	14.0					25
26													26							0.70	14.0					26
27													27							0.70	14.0					27
28													28							0.70	14.0					28
29													29							0.72	14.6					29
30									XX	XXX			30							0.71	14.3					30
31			XX	XXX					XX	XXX			31	XX	XXX			XX	XXX	0.67	13.2			XX	XXX	31
TOTAL																					107.4		9.1			117
Mean																										
Sec. ft. per square mile																										
Rainfall depth [illegible]																										
[illegible]																					213		18			231
[illegible]																										
[illegible]																										

Note. Prepared under the direction of R. J. Tipton, May, 1933.
All gage heights from charts.

C. Hawthorne
C. E. McGraw
5/17/33

C. Hawthorne
C. E. McGraw
5/17/33

C. Hawthorne
C. E. McGraw
5/17/33

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STATE OF COLORADO

Engineering Department

Daily gage height, in feet, and discharge, in second-feet, of LOST LAKE DITCH

River at near Outlet

Bristol automatic Continuous

for year ending September 30, 1931

Day	OCT Gage height	OCT Discharge	NOV Gage height	NOV Discharge	DEC Gage height	DEC Discharge	JAN Gage height	JAN Discharge	FEB Gage height	FEB Discharge	MAR Gage height	MAR Discharge	Day	APR Gage height	APR Discharge	MAY Gage height	MAY Discharge	JUNE Gage height	JUNE Discharge	JULY Gage height	JULY Discharge	AUG Gage height	AUG Discharge	SEPT Gage height	SEPT Discharge	Day
1													1													1
2													2													2
3													3													3
4													4													4
5													5													5
6													6													6
7													7													7
8													8													8
9													9													9
10													10									0.60	16 hrs 7.1			10
11													11									0.58	10.7			11
12													12									0.58	10.7			12
13													13									0.58	9.2			13
14													14									0.50	8.4			14
15													15									0.34	4.7			15
16													16									0.14	1.2			16
17													17									0.10	0.8			17
18													18									0.06	8 hrs 0.1			18
19													19													19
20													20													20
21													21													21
22													22													22
23													23													23
24													24													24
25													25													25
26													26													26
27													27													27
28													28													28
29													29													29
30													30													30
31													31													31
Total																						53.2				53
Second-feet per sq. mile																										
Run-off in acre-feet																						106				106

Prepared under the direction of H. J. Tipton, Dec. 1931.

All gage heights from charts.

T. Hawthorne C. E. McGaw 5/17/33

T. Hawthorne C. E. McGaw 5/17/33

T. Hawthorne C. E. McGaw 5/17/33

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[fol. 3188]

DEFENDANT'S EX. D-3

Summary of Laramie-Poudre Tunnel Discharge, 1922–1932

Compiled from Automatic Register Charts and Water Commissioner's Reports, Under the Direction of R. J. Tipton, May, 1933

Values in Acre-Feet

Year	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1922	.....	29	1,511	3,850	762	555	107	238	248	.....	7,300
1923	.....	415	2,620	1,411	4,843	768	143	.....	.....	.....	10,200
1924	.....	.....	1,101	50	1,355	690	1,030	194	70	.....	4,490
1925	62	928	1,100	2,275	782	1,183	2,002	1,401	1,130	337	11,200
1926	.....	.....	1,936	764	1,340	1,030	990	.....	.....	.....	6,060
1927	.....	649	1,485	3,000	858	336	870	467	.....	.....	7,665
1928	.....	300	2,790	4,400	2,170	300	254	189	.....	.....	10,403
1929	.....	.....	1,451	3,375	2,050	417	280	1,332	.....	.....	8,905
1930	.....	.....	647	1,320	608	425	.....	.....	.....	.....	3,000
1931	.....	.....	214	1,430	879	377	.....	.....	.....	.....	2,900
1932	.....	.....	1,856	5,373	3,160	2,060	978	222	.....	.....	13,649
Totals	62	2,321	16,711	27,248	18,807	8,141	6,654	4,043	1,448	337	85,772
Means	6	211	1,519	2,477	1,710	740	604	367	132	31	7,797

[fol. 3189]

DEFENDANT'S EX. E-3

Summary of Skyline Ditch Discharge, 1922-1932

Compiled from Automatic Register Charts and Water Commissioner's Reports, Under the Direction of R. J. Tipton, May, 1933

Values in Acre-Feet

Year	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Tota.
1922	.....	1,095	7,750	4,410	1,745	292	312	437	52	16,093
1923	.....	1,107	3,300	8,680	2,980	377	386	.....	.....	16,830
1924	.....	1,535	3,180	6,830	1,712	70	228	115	.....	13,670
1925	9	2,498	5,938	4,810	1,440	.....	167	25	.....	14,887
1926	.....	2,400	7,060	6,990	2,270	27	.....	.....	.....	18,747
1927	.....	1,990	8,620	7,140	3,085	550	386	270	.....	22,041
1928	.....	1,395	4,890	8,860	3,270	825	.....	.....	.....	19,240
1929	.....	1,225	8,090	8,833	4,045	2,297	.....	.....	.....	24,490
1930	335	2,060	7,390	4,380	3,160	914	.....	.....	.....	18,239
1931	44	1,270	7,620	2,660	1,070	690	305	.....	.....	13,659
1932	.....	1,730	7,440	7,620	1,205	.....	.....	.....	.....	17,995
Totals	388	18,305	71,278	71,213	25,982	6,042	1,784	847	52	195,891
Means	35	1,664	6,480	6,474	2,362	549	162	77	5	17,808

[fol. 3190] DEFENDANT'S EX. F-3

Summary of Sand Creek Ditch Discharge, 1922–1932

Compiled from Automatic Register Charts and Water Commissioner's Reports Under the Direction of R. J. Tipton, May, 1933

Values in Acre-Feet

Year	April	May	June	July	Total
1922	..	1,022	1,912	276	3,210
1923	..	944	3,820	176	4,940
1924	..	825	948	.....	1,773
1925	36	2,670	1,510	.....	4,216
1926	..	2,390	186	.....	2,576
1927	..	1,340	1,840	220	3,400
1928	..	1,295	.....	.....	1,295
1929	..	619	4,430	466	5,515
1930	..	10	1,520	1,300	2,830
1931	..	920	1,270	.....	2,190
1932	..	1,720	3,112	163	4,995
Totals	36	13,755	20,548	2,601	36,940
Means	3	1,250	1,868	236	3,358

[fol. 3191] DEFENDANT'S EX. G-3

Summary of Lost Lakes Outlet Discharge, 1923–1932

Compiled from Automatic Register Charts, Under the Direction of R. J. Tipton, May, 1933

Values in Acre-Feet

Year	April	May	June	July	August	Total
1923	....	....	....	192	442	634
1924	....	....	....	....	.....	0
1925	....	....	....	....	.....	0
1926	....	213	25	337	288	863
1927	....	....	....	....	454	454
1928	....	....	....	....	411	411
1929	....	....	....	....	470	470
1930	....	....	....	213	18	231
1931	....	....	....	....	106	106
1932	....	....	....	....	.....	0
Totals	0	213	25	742	2,189	3,169
Means	0	21	3	74	219	317

[fol. 3192] DEFENDANT'S EX. H-3

Summary of Bob Creek Ditch Discharge, 1922-1932

Compiled from Water Commissioner's Reports, Under the Direction of R. J. Tipton, June, 1933

Values in Acre-Feet

Year	April	May	June	July	Total
1922	.....	246	258	4	508
1923	.....	345	472	278	1,095
1924	.....	.....	.....	.....	0
1925	.....	522	216	.....	738
1926	.....	.....	.....	.....	0
1927	.....	627	366	35	1,028
1928	.....	236	225	65	526
1929	.....	200	878	65	1,143
1930	40	387	204	.....	631
1931	.....	344	254	35	633
1932	.....	459	363	.....	822
Totals	40	3,366	3,236	482	7,124
Means	4	306	294	44	648

[fol. 3193] DEFENDANT'S EX. I-3

Summary of Columbine Ditch Discharge, 1922-1932

Compiled from Water Commissioner's Reports, Under the Direction of R. J. Tipton, June, 1933

Values in Acre-Feet

Year	May	June	July	Total
1922	60	116	4	180
1923	20	101	208	329
1924	.....	.....	.....	0
1925	92	165	.....	257
1926	.....	.....	.....	0
1927	95	234	42	371
1928	15	271	83	369
1929	.....	501	84	585
1930	48	110	.....	158
1931	61	133	16	210
1932	45	129	.....	174
Totals	436	1,760	437	2,633
Means	39	160	40	239

[fol. 3194]

DEFENDANT'S EX. J-3

Summary of Total Transmountain Diversions from the Laramie River to the Cache la Poudre River for the Years 1922 to 1932, both Inclusive

Compiled from Automatic Register Charts and Water Commissioner's Reports.

Prepared under the Direction of R. J. Tipton, June, 1933.

Values in Acre-Feet

Year (1)	Sky Line Ditch (2)	Laramie-Poudre Tunnel (3)	Lost Lakes Outlet (4)	Columbine Ditch (5)	Bob Creek Ditch (6)	Sand Creek Ditch (7)	Total (8)	Total excluding Sand Creek Ditch (9)	Percent of 33,500 A.-Ft. (10)
1922	16,093	7,300	.....	180	508	3,210	27,291	24,081	72
1923	16,830	10,200	634	329	1,095	4,940	34,028	29,088	87
1924	13,670	4,490	0	0	0	1,773	19,933	18,160	54
1925	14,887	11,200	0	257	738	4,216	31,298	27,082	81
1926	18,747 (a)	7,125	863	0	0	2,576	29,311	26,735	80
1927	22,041	7,665	454	371	1,028	3,400	34,959	31,559	94
1928	19,240	10,403	411	369	526	1,295	32,244	30,949	92
1929	24,490	8,905	470	585	1,143	5,515	41,108	35,593	106
1930	18,239	3,000	231	158	631	2,830	25,089	22,259	66
1931	13,659	2,900	106	210	633	2,190	19,698	17,508	52
1932	17,995	13,649	0	174	822	4,995	37,635	32,640	97
Means	17,808	7,894	(b) 317	239	648	3,358	30,236	26,878	80

(a) March 24 to April 30 diversions supplied from Defendant's Exhibit T.
(b) Ten year mean.

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(Here follows photograph of Defendant's Exhibit K-3 side
folio 3195)

DEFENDANT'S EXHIBIT K-3

STATE OF COLORADO
ENGINEERING DEPARTMENT
CURRENT METER NOTES

DATE 6-23- 1933 TIME BEGIN 3:20 Pm END 4:00 Pm

DIV. 1 DIST. 3

Laramie-Poudre Tunnel RIVER, AT East Portal at 6' Parshall Flume

GAGE HT. BEGINNING 2.82 FT. ENDING 2.84 FT. MEAN 2.83 FT. METER NO. 19

MEAS. L. T. Burgess NOTES BY L. T. Burgess

Dist. from initial point	Depth	Depth of observat.	Revolutions	Time in seconds	Velocity At point	Velocity Mean in vertical	Velocity Mean in section	Area	Mean Depth	Width	Discharge
0.4	3.05	0.2	100	49	4.69						
		0.8	50	46	2.54	3.62					
1	3.08	0.2	100	53	4.34		3.43	1.84	3.06	0.6	6.31
		0.8	50	55	2.13	3.24					
2	3.08	0.2	100	58	3.98		3.25	3.08	3.08	1	10.01
		0.8	60	55	2.54	3.26					
3	3.07	0.2	100	51.5	4.47		3.81	3.08	3.08	1	11.73
		0.8	100	54	4.26	4.36					
4	3.08	0.2	100	42	5.46		4.85	3.08	3.08	1	14.94
		0.8	100	44	5.22	5.34					
5	3.05	0.2	100	40	5.73		5.54	3.06	3.06	1	16.95
		0.8	100	40	5.73	5.73					
6	3.04	0.2	100	38.5	5.95		5.84	3.04	3.04	1	17.75
		0.8	100	38.5	5.95	5.95					
7	3.04	0.2	100	38	6.03		5.99	3.04	3.04	1	18.21
		0.8	100	38	6.03	6.03					
8.6	2.97	0.2	100	38	6.03		5.92	4.80	3.00	1.6	28.42
		0.8	100	41	5.59	5.81					
											124.32

Sand-Gravel and boulders extend into mouth of flume.

Dfdt's Ex. K-3.

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PLACE NOTES ON BACK OF SHEET

3195

[fol. 3196]

DEFENDANT'S EX. L-3

(Copy of Defendants' Exhibit 124)

State of Colorado—Engineering Department

Discharge of Cache la Poudre (Net Run-off Table—Acre Feet) at Mouth of Canon from April to October, Inclusive
Drainage Area, 1,060 Square Miles

	Cache la Poudre at canon	Skyline	Sand Crk. Ditch	Grand R. Ditch	Michigan Ditch	Poudre V. Ditch	No. Poudre Canal	Net run-off at canon	Percent of normal
1884	666,466	.....	.....	.....	.....	.....	.....	666,466	224
1885	465,475	.....	.....	.....	.....	.....	.....	465,475	157
1886	290,392	.....	.....	.....	.....	.....	.....	290,392	98
1887	286,840	.....	.....	.....	.....	.....	.....	286,840	96
1888	155,970	.....	.....	.....	.....	.....	.....	155,970	52
1889	185,067	.....	.....	.....	.....	.....	.....	185,060	62
1890	221,023	.....	.....	.....	.....	.....	.....	221,023	74
1891	257,236	.....	.....	.....	.....	.....	.....	257,236	87
1892	193,790	.....	.....	.....	.....	.....	.....	193,790	65
1893	216,730	.....	.....	.....	.....	.....	.....	216,730	73
1894	309,444	.....	.....	.....	.....	.....	.....	309,444	104
1895	344,500	.....	.....	.....	.....	.....	.....	344,500	116
1896	162,340	.....	.....	.....	.....	.....	.....	162,340	55
1897	332,070	.....	.....	.....	.....	.....	.....	332,070	112
1898	172,290	.....	.....	.....	.....	.....	.....	172,290	58
1899	389,490	17,699	.....	.....	.....	.....	16,800	388,591	131
1900	471,790	18,657	.....	.....	.....	.....	21,440	474,573	160
1901	326,960	23,805	.....	.....	.....	.....	36,000	339,155	114
1902	173,963	22,124	1,925	.....	.....	.....	1,722	151,636	51
1903	326,920	26,114	1,713	1,707	.....	4,936	42,828	345,150	116
1904	321,456	23,434	6,810	1,975	.....	°15,000	11,200	315,437	106
1905	335,974	13,291		6,170	861	°20,000	26,000	361,652	122
1906	275,534	16,693	5,004	11,980	1,923	21,980	18,060	279,974	94

°Estimated.

DEFENDANT'S EXHIBIT L-3—Continued

	Cache la Poudre at canon	Skyline	Sand Crk. Ditch	Grand R. Ditch	Michigan Ditch	Poudre V. Ditch	No. Poudre Canal	Net run-off at canon	Percent of normal
1907	369,510	15,024	5,400	12,612	3,980	28,210	25,520	386,224	130
1908	244,169	17,958	2,092	16,775	4,123	23,546	26,076	252,843	85
1909	448,124	12,725	0	15,593	3,752	26,160	43,788	486,002	163
1910	150,116	16,435	783	9,883	2,308	15,551	21,256	157,514	53
1911	234,490	19,085	4,418	13,442	2,842	2,068	8,840	205,611	69
1912	306,702	20,986	2,157	15,741	4,746	9,150	25,500	297,722	100
1913	208,329	14,639	0	12,214	3,747	5,670	34,560	217,959	73
Mean								297,322	

G. L. C. Mar. 4, '14.

[fol. 3197] DEFENDANT'S EX. M-3

Summary of Sky Line Ditch Divisions for the Years 1899 to 1932, Both Inclusive

Values for years 1899 to 1913, inclusive, are from Defendant's Exhibit No. L-3 (Defendant's Exhibit 124 in original Wyoming vs. Colorado case).

Values for years 1914 to 1921, inclusive, are from Defendant's Exhibit No. A.

Values for year 1922 are from weekly reports of Water Commissioner of District No. 3.

Values for years 1923 to 1932, inclusive, are from Defendant's Exhibit No. E-3.

Prepared under the direction of R. J. Tipton, June, 1933.

Year (1)	Diversions by Sky Line Ditch Acre-Feet (2)
1899	17,699
1900	18,657
1901	23,805
1902	22,124
1903	26,114
1904	23,434
1905	13,291
1906	16,693
1907	15,024
1908	17,958
1909	12,725
1910	16,435
1911	19,085
1912	20,986
1913	14,639
1914	10,200
1915	15,000
1916	20,300
1917	11,500
1918	15,800
1919	14,400
1920	13,900
1921	14,300
1922	16,093
1923	16,830

Year (1)	Diversions by Sky Line Ditch Acre-Feet (2)
1924	13,670
1925	14,887
1926	18,747
1927	22,041
1928	19,240
1929	24,490
1930	18,239
1931	13,659
1932	17,995
Mean 1899—1913, inclusive	18,578 A.-Ft.
" 1899—1932, "	17,352 "
" 1914—1932, "	16,384 "
" 1922—1932, "	17,808 "

[fol. 3198] DEFENDANT'S EX. N-3

Summary of Laramie-Poudre Tunnel Diversions for Years 1914 to 1932, Both Inclusive

Values for Years 1914 to 1921, inclusive, are from Defendant's Exhibit No. A.

Values for Years 1922 to 1932, inclusive, are from Defendant's Exhibit No. D-3.

Prepared under the direction of R. J. Tipton, June, 1933.

Year (1)	Diversions by Sky Line Ditch Acre-Feet (2)
1914	813
1915	4,960
1916	4,520
1917	392
1918	10,700
1919	4,090
1920	12,400
1921	9,230
1922	7,300
1923	10,200
1924	4,490
1925	11,200
1926	7,125

Year (1)	Diversions by Sky Line Ditch Acre-Feet (2)
1927	7,665
1928	10,403
1929	8,905
1930	3,000
1931	2,900
1932	13,649
Mean 1914—1921, inclusive	5,888 A.-Ft.
" 1914—1932, "	7,045 "
" 1922—1932, "	7,894 "

[fol. 3199] DEFENDANT'S EX. O-3

Summary of Sand Creek Ditch Diversions for the Years 1902 to 1932, Both Inclusive

Values for Years 1902 to 1913, inclusive, are from Defendant's Exhibit No. L-3 (Defendant's Exhibit 124 in original Wyoming vs. Colorado case).

Values for Years 1914 to 1921, inclusive, are from Defendant's Exhibit No. A.

Values for Year 1922 are from reports of the Water Commissioner for District No. 3.

Values for Years 1923 to 1932, inclusive, are from Defendant's Exhibit No. F-3.

Prepared under the direction of R. J. Tipton, June, 1933.

Year (1)	Diversions by Sand Creek Ditch Acre-Feet (2)
1902	1,925
1903	1,713
1904	6,810
1905	0
1906	5,004
1907	5,400
1908	2,092
1909	0
1910	783
1911	4,418

Year (1)	Diversions by Sand Creek Ditch Acre-Feet (2)
1912	2,157
1913	0
1914	935
1915	1,990
1916	2,870
1917	(a) 0
1918	3,240
1919	2,510
1920	0
1921	0
1922	3,210
1923	4,940
1924	1,773
1925	4,216
1926	2,576
1927	3,400
1928	1,295
1929	5,515
1930	2,830
1931	2,190
1932	4,995

(a) No diversion reported.

DEFENDANT'S EX. P-3

April to October and Annual Discharge of Cache la Poudre River at Mouth of Canyon for the Years 1911 to 1932, inclusive, Corrected for Diversions around Gaging Station and Transmountain Diversions

Prepared Under the Direction of R. J. Tipton, June, 1933

Values in Acre-Feet

Year (1)	Recorded flow		Total divert around station (4)	Recorded flow plus diversions		Total transmt. divers. to Poudre (7)	Flow corrected for transmt. div.		Percent of 1884–1932* mean (10)
	Annual (2)	Apr.-Oct. (3)		Annual (2) & (4) (5)	Apr.-Oct. (3) & (4) (6)		Annual (5)–(7) (8)	Apr.-Oct. (6)–(7) (9)	
1911	253,000	234,490	10,908	263,908	245,398	39,787	224,121	205,611	69
1912	320,800	306,702	34,650	355,450	341,352	43,630	311,820	297,722	100
1913	219,900	208,329	40,230	260,130	248,559	30,600	229,530	217,959	73
1914	404,500	387,630	39,310	443,810	426,940	22,350	421,460	404,590	135
1915	239,100	221,600	36,295	275,395	257,895	36,692	238,703	221,203	74
1916	279,200	255,560	41,700	320,900	297,260	48,704	272,196	248,556	83
1917	513,700	499,800	28,505	542,205	528,305	20,964	521,241	507,341	169
1918	317,100	299,870	56,450	373,550	356,320	46,771	326,779	309,549	103
1919	164,100	148,060	23,470	187,570	171,530	33,784	153,786	137,746	46
1920	364,400	350,180	79,700	444,100	429,880	46,516	397,584	383,364	128
1921	396,100	382,740	54,250	450,350	436,990	37,874	412,476	399,116	133
1922	205,600	192,850	28,840	234,440	221,690	43,391	191,049	178,299	60
1923	445,800	434,560	57,642	503,442	492,202	51,682	451,760	440,520	147
1924	446,890	430,030	50,230	497,120	480,260	29,115	468,005	451,145	151
1925	222,340	206,390	40,630	262,970	247,020	56,306	206,664	190,714	64
1926	381,330	359,380	65,750	447,080	425,130	48,829	398,251	376,301	126
1927	260,730	247,610	49,190	309,920	296,800	56,832	253,088	239,968	80
1928	302,000	286,250	66,379	368,379	352,629	50,362	318,017	302,267	101
1929	332,790	320,800	72,049	404,839	392,849	61,025	343,814	331,824	111
1930	222,010	214,330	43,837	265,847	258,167	42,692	223,155	215,475	72
1931	176,921	166,970	34,118	211,039	201,088	35,343	175,696	165,745	55
1932	261,300	251,160	41,150	302,450	292,310	59,416	243,034	232,894	78
Means 1911–1932							308,283	293,541	98.1
1884–1932								299,112	100.0
1925–1932								256,900	86.0

*1884–1932 mean determined from Defendant's Exhibit L-3 and this exhibit.

[fol. 3201] DEFENDANT'S EX. Q-3

Annual Flow of Cache la Poudre River at Mouth of Canyon, Corrected for Transmountain Diversions and Diversions around Gaging Station, from Defendant's Exhibit No. —

According to method of analysis used by Elmer K. Nelson, Civil Engineer, in study of flow of Laramie River, Wyoming, April, 1933

Prepared Under the Direction of R. J. Tipton, June, 1933

Values in Acre-Feet

Year	Year of period	Mean runoff at year A.-Ft.	Runoff Cache la Poudre R. A.-Ft.	Runoff index mean 330,036	Mean index at year	Percent variation from mean cumulative
1911	1	.....	224,121	67.9	.....	− 32.1
1912	2	.....	311,820	94.4	.....	− 37.7
1913	3	.....	229,530	69.5	.....	− 68.2
1914	4	.....	421,460	127.8	.....	− 40.4
1915	5	.....	238,703	72.3	.....	− 68.1
1916	6	.....	272,196	82.5	.....	− 85.6
1917	7	.....	521,241	157.9	.....	− 27.7
1918	8	.....	326,779	99.0	.....	− 28.7
1919	9	.....	153,786	46.7	.....	− 82.0
1920	10	.....	397,584	120.4	.....	− 61.6
1921	11	.....	412,476	125.0	.....	− 36.6
1922	12	.....	191,049	57.9	.....	− 78.7
1923	13	.....	451,760	136.9	.....	− 41.8
1924	14	330,036	468,005	141.8	100	0.0
1925	15	.....	206,664	62.6	.....	− 37.4
1926	16	.....	398,251	120.6	.....	− 16.8
1927	17	.....	253,088	76.7	.....	− 40.1
1928	18	.....	318,017	96.4	.....	− 43.7
1929	19	.....	343,814	104.1	.....	− 39.6
1930	20	.....	223,155	67.7	.....	− 71.9
1931	21	.....	175,696	53.2	.....	−118.7
1932	22	308,283	243,034	73.6	93.4	−145.1
Total	22		6,782,229			

[fol. 3202] DEFENDANT'S EX. R-3

Annual Recorded Flow of Arkansas River at Canon City, Colorado, Corrected for Diversions directly above Gaging Station, from Records of State Engineer of Colorado

According to method of analysis used by Elmer K. Nelson, Civil Engineer in study of run-off Laramie River, Wyoming, April, 1933

Year	Year of period	Mean run-off at year acre-ft.	Run-off Arkansas River acre-ft.	Run-off index mean 651,600	Mean index at year	Percent variation from mean cumulative
1911	1	.....	702,000	107.7	.....	7.7
1912	2	.....	672,000	103.1	.....	10.8
1913	3	.....	486,000	74.6	.....	− 14.6
1914	4	.....	722,000	110.8	.....	− 3.8
1915	5	.....	548,000	84.1	.....	− 19.7
1916	6	.....	688,000	105.6	.....	− 14.1
1917	7	.....	673,000	103.3	.....	− 10.8
1918	8	.....	639,000	98.1	.....	− 12.7
1919	9	.....	640,000	98.2	.....	− 14.5
1920	10	.....	690,000	105.9	.....	− 8.6
1921	11	.....	720,000	110.5	.....	1.9
1922	12	.....	562,000	86.2	.....	− 11.9
1923	13	.....	706,000	108.4	.....	− 3.5
1924	14	651,600	674,000	103.5	100.0	0.0

DEFENDANT'S EX. R-3—Continued

Year	Year of period	Mean run-off at year acre-ft.	Run-off Arkansas River acre-ft.	Run-off index mean 651,600	Mean index at year	Percent variation from mean cumulative
1925	15	.....	431,000	66.2	.....	− 33.8
1926	16	.....	553,000	85.0	.....	− 48.8
1927	17	.....	609,000	93.6	.....	− 55.2
1928	18	.....	576,000	88.5	.....	− 66.7
1929	19	.....	637,000	97.8	.....	− 68.8
1930	20	.....	521,000	80.0	.....	− 88.8
1931	21	.....	333,000	51.2	.....	−137.6
1932	22	604,200	510,000	78.3	92.8	−159.3
Total	22		13,292,000			

[fol. 3203] DEFENDANT'S EX. S-3

Annual Recorded Flow of Rio Grande River at Del Norte Corrected for Reservoir Storage above Gaging Station, from Biennial Reports of State Engineer of Colorado

According to method of analysis used by Elmer K. Nelson, Civil Engineer, in study of flow of Laramie River, Wyoming, April, 1933

Values in 1000 A.-Ft.

Year	Year of period	Mean at year A.-Ft.	Run-off Rio Grande A.-Ft.	Run-off index mean 832.9	Mean index at year	Percent variation from mean cumulative
1911	1	.....	922.2	110.8	.....	10.8
1912	2	.....	969.9	116.6	.....	27.4
1913	3	.....	536.8	64.5	.....	− 8.1
1914	4	.....	789.3	94.8	.....	− 13.3
1915	5	.....	687.3	82.5	.....	− 30.8
1916	6	.....	825.2	99.1	.....	− 31.7
1917	7	.....	1,010.6	121.4	.....	− 10.3
1918	8	.....	527.0	63.3	.....	− 47.0
1919	9	.....	764.4	91.9	.....	− 55.1
1920	10	.....	995.7	119.7	.....	− 35.4
1921	11	.....	1,020.6	123.4	.....	− 12.0
1922	12	.....	983.7	118.1	.....	6.1
1923	13	.....	780.8	93.8	.....	− 0.1
1924	14	831.9	833.5	100.1	.....	0.0
Total	11–24		11,647.0			
Storage			14.1			
Total corrected			11,661.1			
Mean corrected		832.9			100.0	
1925	15	.....	652.9	78.4	.....	− 21.6
1926	16	.....	710.7	85.4	.....	− 36.2
1927	17	.....	898.1	107.8	.....	− 28.4
1928	18	.....	740.5	88.9	.....	− 39.5
1929	19	.....	863.0*	103.6	.....	− 35.9
1930	20	.....	598.5*	71.9	.....	− 64.0
1931	21	.....	353.6*	42.4	.....	−121.6
1932	22	789.2	897.6*	107.8	.....	−113.8
Total	22		17,361.9			
Storage			28.8			
Total corrected			17,390.7			
Mean corrected		790.5			95.0	

* Corrected for diversions by Del Norte Irr. Dist. above gaging station.

[fol. 3204] DEFENDANT'S EX. T-3

Discharge of Laramie River at Woods Landing, Wyoming, from 1911 to 1932, If Total Diversions from Laramie-Poudre Tunnel, Columbine and Bob Creek Ditches Had Equaled 15,500 Acre-Feet per Year

Prepared Under the Direction of R. J. Tipton, June, 1933

Values in Acre-Feet

Year	Yearly runoff Laramie near Woods, Wyo. col. 4 compl. ex. 52	Percent of 154,500 acre-feet	15,500 a.-ft. minus actual tunnel Columbine & Bob Creek Divers	(2)–(4)	Percent of 154,500 acre-feet	Apr.-Oct. Cache la Poudre at Canyon flow in percent of 1884–1932 mean
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1911.....	151,000	97.7	15,500	135,500	88	69
1912.....	206,000	133.3	15,500	190,500	123	100
1913.....	110,000	71.2	15,500	94,500	61	73
1914.....	189,000	122.3	14,800	174,200	113	135
1915.....	92,200	59.6	10,500	81,700	53	74
1916.....	153,000	99.0	11,000	142,000	92	83
1917.....	274,000	177.3	15,100	258,900	168	169
1918.....	182,000	117.8	4,800	177,200	115	103
1919.....	81,000	52.4	11,400	69,600	45	46
1920.....	216,000	139.7	2,200	213,800	138	128
1921.....	205,000	132.7	4,400	200,600	130	133
1922.....	104,000	67.3	7,500	96,500	62	60
1923.....	201,000	130.1	3,900	197,100	128	147
1924.....	170,000	110.0	11,000	159,000	103	151
1925.....	105,000	68.0	3,300	101,700	66	64
1926.....	183,000	118.4	8,400	174,600	113	126
1927.....	137,000	88.7	6,400	130,600	85	80
1928.....	180,000	116.5	4,200	175,800	114	101
1929.....	183,000	118.5	4,900	178,100	115	111
1930.....	118,000	76.4	11,700	106,300	69	72
1931.....	80,000	51.8	11,800	68,200	44	55
1932.....	145,000	93.8	860	144,140	93	78
Means						
1911–32..	157,510	102	.....	148,660	96	98
1925–32..	141,400	91	.....	134,900	87	86
1911–32 Omit '31	161,200	104.4	.....	152,490	99	100

(Here follow photolithograph of Defendant's Exhibits X-3 and Y-3, side folios 3205 to 3210, inclusive.)

1626A

EPHEN CORLETT DOWNEY
AND PROSECUTING ATTORNEY
ALBANY COUNTY, WYOMING
OFFICE ROOM 208 RIVERS BUILDING
POST OFFICE BOX 389

DEFENDANT'S EXHIBIT X-3

LARAMIE WYOMING November 24, 1926.

Letter X-3

H. D. Parker, President,
Laramie Poudre Irrigation Co.,
Greeley, Colorado.

Dear Sir:

Miss Agnes Zimmerman, personally and as agent for other parties interested in the John Zimmerman estate on their ranch situated on the Cache La Poudre River near Home postoffice, has retained me in relation to the adjustment of her conflicts with you and others in the matter of the water rights and damages to the land by trans-mountain diversion.

I have not gone into the matter very thoroughly, nor have I given it much time. But from the general statement of Miss Zimmerman and papers she has in her possession, it seems to me that Miss Zimmerman has a cause of action against you and others. You ought to know, or can easily find out from information from your engineers and other papers in your records, how much the Zimmerman Ranch has been damaged.

It will be a very expensive and disagreeable matter to work up the evidence in this case, as it involves such a scope of territory in relation to the diversion of water rights. And I did not think that I would be justified in putting Miss Zimmerman to this expense unless I first told you what was being done, and that perhaps you would be willing to try to adjust the matter out of Court.

If it becomes necessary to commence a suit to protect the Zimmerman interests, of course it will be necessary for me to obtain the evidence and involve in this suit the water interests in Jackson County and Grand County as these rights are conflicting.

It also probably would be necessary to include in this action the users on the North Platte in Nebraska. This would make an endless complication and probably would cause damage which can be avoided. If this suit were tried, it would furnish information to California on their Imperial Water suit which might be very adverse to Colorado.

It would be perfectly satisfactory with me if you would take the matter up with Miss Zimmerman directly as she is located nearer to you than I am. If I do not hear from you by the 10th of December next, I will proceed to collect the evidence and commence a proper suit to protect the interests of the Zimmerman estate.

HDP--2

Similar letters have been sent to:

The Water Supply & Storage Co., A. C. Kluver, President;
The Mountain & Plains Irrigation Co., Roy A. Portner, President;
North Poudre Irrigation Company, E. F. Monroe, President.

Thanking you for your kindness in the matter, I am

Yours truly,

SCD:EW

S. C. Downey
RETURN IN THREE DAYS TO
BOX 395
LARAMIE, WYO.

REGISTERED RETURN RECEIPT REQUESTED

Return [illegible] quested.

REGISTERED
2862

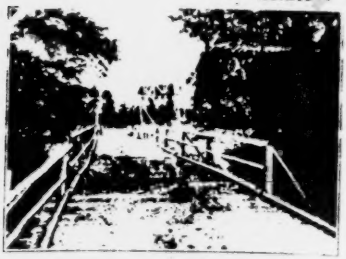
H. D. Parker, President,
Laramie Poudre Irrigation Co.,
Greeley, Colorado.

GREELEY, COLO.
NOV 26 1923
REGISTERED

3207

16260

DEFENDANT'S EXHIBIT Y-3



THE SPORTSMAN'S MECCA
WHERE TROUT AND ALL GAME ABOUNDS
FIVE MILES OF CACHE LA POUDRE RIVER
PRIVATELY OWNED

ZIMMERMAN'S
SUMMER RESORT

Home, Larimer County,
Colorado

11/18/32

Mr. L. C. Moore
Fort Collins
Colo.

Def Ex "Y 3"

Dear Mr. Moore

For your information, or more particularly to save some poor devil a long expensive and useless trip up here, I am writing to tell you Cameron Pass is closed as well as the Laramie river road past Chamberlain's Lake. We had to send the family you directed in here for information on getting to Coalmont back

16261

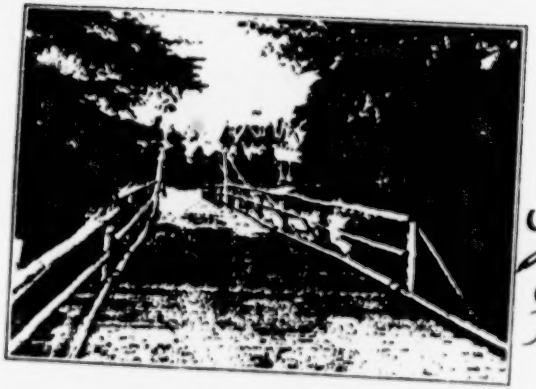
to Ind's via the Forks Hotel.

How do you like the Monkey wrench in your loan from the Reconstruction Finance Corporation? You have had the pleasure of doing that to me several times!

Cordially

Agnes Zimmerman

3209



Zimmerman's Summer Resort
Larimer County
Home, Colorado

Personal

Rec'd Dec 31, 1932

Mr. L. C. Moore
First National Bank
Fort Collins
Colorado

3210

FILE COPY

OCT 13
CHARLES ELMORE

In the
Supreme Court of the United States
In Equity

October Term, 1930

No. 10 [redacted] 15

THE STATE OF WYOMING, *Complainant,*
vs.
THE STATE OF COLORADO, *Defendant.*

Original
Motion for Leave to File Bill of Complaint in Equity and Original Bill of Complaint

WILLIAM O. WILSON,
Attorney General of the State of Wyoming.
JAMES A. GREENWOOD,
Deputy Attorney General.
RICHARD J. JACKSON,
Assistant Attorney General.
PHILIP S. GARBUTT,
Assistant Attorney General.

Solicitors for Complainant

WYOMING LABOR JOURNAL, CHEYENNE

In the

Supreme Court of the United States
In Equity

October Term, 1930

No.....

THE STATE OF WYOMING,
Complainant,

vs.

THE STATE OF COLORADO,
Defendant,

Original

Motion for Leave to File Bill of Complaint in Equity

To the Honorable The Chief Justice and the Associate Justices of the Supreme Court of the United States:

The State of Wyoming, one of the states of the union of the United States of America, appearing by William O. Wilson, its attorney general, upon the application of Frank C. Emerson, Governor of the State of Wyoming, and in compliance with the request of Honorable John A. Whiting, State Engineer and its Commissioner charged with author-

ity in relation to interstate streams, respectfully applies for leave to file as an original cause in this court its bill of complaint in equity against the State of Colorado, which bill of complaint is attached hereto and submitted herewith.

The State of Wyoming respectfully shows that in an original proceeding in this court commenced by the State of Wyoming on or about the 29th day of May, A. D. 1911 and reported under the name of Wyoming vs. Colorado in Volume 259, United States Supreme Court Reports, Page 419, wherein this Honorable Court considered and determined the rights of the State of Wyoming and of the State of Colorado, and through said state the rights of the respective citizens, residents and inhabitants thereof, to appropriate and apply to beneficial use the waters of the Laramie River, a stream with its headwaters in the State of Colorado and flowing into and through a portion of the State of Wyoming.

That in the final determination of said court, as found in the decree entered in said original cause, reported in Volume 259, United States Supreme Court Reports, Page 496, it was decreed that the annual available supply of water for appropriation and application to beneficial use from said Laramie River and/or its tributaries was in the amount of 310,250 acre-feet.

That the State of Colorado is entitled to divert, appropriate and use, by means of what is in said decree designated as the Skyline Ditch Diversion, the annual amount of 18,000 acre-feet; the further amount of 4,250 acre-feet annually to be diverted and applied to the irrigation of that number of acres of meadow lands in the State of Colorado; which said appropriations and diversions by said decree were recognized as having a priority over any appropriations in the State of Wyoming;

That Wyoming had the right to divert, appropriate and apply to beneficial use 272,500 acre-feet of water annually of said stream and/or its tributaries to irrigate 181,500 acres of land in the State of Wyoming; leaving the amount of 15,500 acre-feet available annually for diversion through the Laramie-Poudre Tunnel;

That such findings and determinations by said court as to the use of said waters in said respective amounts should not prejudice the right of the State of Colorado, or of anyone recognized by her as duly entitled thereto, to continue to exercise the right then existing and recognized to divert and take from the headwaters of Deadman Creek, a Colorado tributary of the Laramie River, the relatively small amount of water appropriated therefrom prior to the year 1902 by and through the Wilson Supply Ditch; nor prejudice nor affect the right of the State of Colorado, or the State of Wyoming, or anyone recognized by either state as duly entitled thereto, to continue to exercise the right to divert and use water from Sand Creek, sometimes spoken of as a tributary of Laramie River; in virtue of any then existing and lawful appropriation of waters of said creek;

That notwithstanding such findings and determinations by this Honorable Court as to the rights of the State of Colorado and the State of Wyoming to divert and appropriate to beneficial use the waters of said Laramie River and/or its tributaries in the manner and amount as in said final decree stated, which said decree is found, made and entered, in said original cause, and reported in Volume 259, United States Supreme Court Reports, Page 496, wherein the amount of water available for appropriation for the State of Colorado was found, stated and limited to an aggregate amount of 37,750 acre-feet to be diverted annually by means of the several diversions as recognized in said

decree, the State of Colorado is now and has been for a period of many years last past, and threatens to continue, acting through its officers, agents and representatives, making excessive, additional and/or unlawful diversions of water from the watershed of said Laramie River and/or its tributaries; and through its officers and agents authorize and permit the users of water from such unlawful diversion to have adjudicated to them, and for their benefit, decrees recognizing and allowing the continuance of such unlawful diversions, which are accomplished by means of the following storage and diversions, to-wit: the Bob Creek ditch; Lost Lake Reservoir system, consisting of Laramie Lake, Lost Lake, Lily Lake and Twin Lakes, the Deadman Ditch Feeder or Wilson Supply ditch; the Deadman Extension Ditch, and the Divide Ditch, and the Skyline Ditch; and the excessive or unrecorded Laramie-Poudre Tunnel diversions, and used to carry such diverted waters over into the Cache la Poudre River for use in the State of Colorado; and also all excessive and unrecorded diversions on the meadow lands in Colorado.

The State of Wyoming now prays leave to file its Bill in Equity in this court and bring to the attention of this court the matters as in its Bill of Complaint set forth and complained of against the State of Colorado, to the end that this court will prevent the continuance of such unlawful diversions of the waters of said Laramie River and/or its tributaries, and prevent further loss and damage to the State of Wyoming and to its citizens, residents and inhabitants by enabling said State of Wyoming to have for the use and benefit of its citizens, residents and inhabitants the waters from said river and/or its tributaries in accordance with the terms of the decree of this court, as determined in said original proceeding in this court heretofore referred to.

Wherefore the State of Wyoming prays leave to file its original Bill of Complaint as above stated.

Respectfull submitted,

THE STATE OF WYOMING

By WILLIAM O. WILSON
Attorney General of the State of Wyoming.
JAMES A. GREENWOOD
Deputy Attorney General of the State of Wyoming.
RICHARD J. JACKSON
Assistant Attorney General of the State of Wyoming.
PHILIP S. GARBUTT
Assistant Attorney General of the State of Wyoming.

In the
Supreme Court of the United States
In Equity

October Term, 1930

No.....

THE STATE OF WYOMING,
Complainant,

vs.

THE STATE OF COLORADO,
Defendant.

Original

Bill of Complaint in Equity

To the Honorable, the Chief Justice and Associate Justices of the Supreme Court of the United States:

The State of Wyoming, by William O. Wilson, Attorney General of the State, under the direction of the Honorable Frank C. Emerson, Governor of the State, and in compliance with the request of the Honorable John A. Whiting, State Engineer of the State, and its Commissioner charged with authority in relation to interstate streams, by leave of this Honorable Court first had and obtained, brings this,

its original bill of complaint, in its own behalf and that of its officials, agents, servants, and other citizens, residents and corporations, against the State of Colorado in its own behalf and that of its officials, agents, servants, representatives and other citizens, residents and corporations; and respectfully sets forth and alleges, as its first cause of action:

FIRST

That your complainant is one of the states of the United States entitled to enjoy all the privileges, rights and powers, and with all the duties, including the duty of protecting the rights, interests and property of its citizens and residents possessed or devolved upon each and all of said states of the United States of America.

SECOND

That the State of Colorado is likewise one of the states constituting the United States of America entitled to enjoy all the privileges, rights and powers, and with all the duties, including the duty of protecting the rights, interests and property of its citizens and residents possessed and devolving upon each and all of said states of the United States of America.

THIRD

That on May twenty-ninth, A. D. 1911, an original suit in equity was instituted in this Honorable Court, by the above named complainant, the State of Wyoming, against the State of Colorado and the Greeley-Poudre Irrigation District and the Laramie-Poudre Reservoirs & Irrigation Company, to prevent a proposed diversion in Colorado of part of the waters of the Laramie River, an interstate stream; the opinion in said case rendered June 5, 1922, appearing

in Vol. 259, U. S. Reports, page 419; 66 Law Edition, page 999; and the modified decree therein entered Oct. 9, 1922, appearing in said 259 U. S. Reports, page 496; 66 Law Edition, page 1026.

FOURTH

That it was found and determined in said case that the said Laramie is an unnavigable river which has its source in the mountains of northern Colorado, flows northerly twenty-seven miles in that state, crosses into Wyoming, and there flows northerly and northeasterly one hundred and fifty miles to the North Platte river, of which it is a tributary; and that both Colorado and Wyoming are in the arid region where flowing waters are, and long have been, commonly diverted from their natural channels and used in irrigating the soil and making it productive; and that for many years some of the waters of the Laramie river have been subjected to such diversion and use, part in Colorado and part in Wyoming.

FIFTH

That this Honorable Court further found the entire water supply available for the proposed Colorado appropriation and the Wyoming appropriations down to and including the diversion for the Wheatland district is 288,000 acre-feet per annum; and that there are some existing Colorado appropriations having priorities entitling them to precedence over many of the Wyoming appropriations; that these recognized Colorado appropriations are 18,000 acre-feet to be diverted by what is known as the Skyline ditch diversion, and 4,250 acre-feet for the irrigation of that number of acres of native-hay meadows in the Laramie valley in Colorado; and that these recognized Colorado appropriations, aggregating 22,250 acre-feet, were not to be deducted from

the 288,000 acre-feet, that being the available annual supply after they are satisfied; and that thus the total available annual supply of water for irrigation, in Wyoming and Colorado out of the waters of the Laramie river and its tributaries, was said 288,000 acre-feet of water, and said 22,250 acre-feet of water; or a total available annual supply of water for irrigation of lands in Colorado and Wyoming from the Laramie river and its tributaries in the total sum of 310,250 acre-feet of water; in addition to the waters of Sand Creek, which rises in Colorado and extends into the Laramie plains in Wyoming, and discharges into Hutton Lake, a few miles from the Laramie River, and the waters of which creek, for reasons stated in the opinion, were not regarded by this Honorable Court as a factor in the controversy;

SIXTH

That this Honorable Court further found and determined that the evidence showed that the Wyoming appropriations having priorities senior to the one in Colorado, and which are dependent on the available water supply before named, cover 181,500 acres of land, and that the amount of water appropriated and reasonably required for the irrigation of said lands is 272,500 acre-feet; that a much larger amount was claimed, but the findings of the court restricted the amount to what the evidence showed was reasonably required; and that as the available supply is 288,000 acre-feet, and the amount covered by senior appropriations in Wyoming is 272,500 acre-feet, there remains 15,500 acre-feet which are subject to the junior appropriation in Colorado, to-wit: the Laramie-Poudre Tunnel appropriation.

SEVENTH

That in and by its final decree, this Honorable Court then considered, ordered and decreed, that the defendants, their officers, agents and servants be, and they were thereby, severally enjoined from diverting or taking from the Laramie River and its tributaries in the State of Colorado, more than fifteen thousand five hundred (15,500) acre-feet of water per annum, in virtue of or through what is designated in the pleadings and evidence as the Laramie-Poudre tunnel appropriation in that state; and provided therein that said decree should not prejudice the right of the State of Colorado, or of anyone recognized by her as duly entitled thereto, to continue to exercise the right existing and thereby recognized to divert and take from such stream and its tributaries in that state the following:

(1) Eigheen thousand (18,000) acre-feet of water per annum in virtue of and through said Skyline ditch appropriation in that state;

(2) Four thousand two hundred and fifty (4,250) acre-feet of water per annum in virtue of and through the meadow-land appropriations in that state;

(3) The relatively small amount of water appropriated from the headwaters of Deadman Creek, a Colorado tributary of the Laramie River, prior to the year 1902, by and through what is designated in the evidence as the Wilson Supply Ditch; and

(4) That the decree should not prejudice or affect the right of the State of Colorado or the State of Wyoming, or anyone recognized by either state as duly entitled thereto, to continue to exercise the right to divert and use water from Sand Creek, sometimes spoken of as a tributary of the Laramie River, by virtue of any existing and lawful appropriation of the waters of such creek.

EIGHTH

That plaintiff has been reliably informed, and therefore on information and belief alleges the fact to be that the gauging and measuring devices installed by the defendant do not accurately gauge and measure the full amount of water diverted by means of and through the designated lawful diversions as defined in the said decree of this Honorable Court.

NINTH

That the State of Colorado, as your complainant is informed and believes, and therefore alleges the fact to be, has permitted water to be diverted from the Laramie River and its tributaries by means of and through the Laramie-Poudre tunnel diversion in excess of 15,500 acre-feet per annum; that during portions of the year 1926, there were, as shown by the official records of Colorado, diversions through said tunnel of 13,572 acre-feet, and unreported diversions through said tunnel in the amount of over 3,000 acre-feet, making a total diversion for the year 1926 in excess of the amount of 15,500 acre-feet as provided in said decree; that such measurements, on which complainant has relied, are from the records certified by the State Engineer of Colorado; based on records of the water commissioner of the district, who compiled the original record of measurements; that, however, the records of the division engineer, certified to by him, show the diversion of 5644 acre-feet, instead of 13,572 acre-feet, of water;

TENTH

That through, by and under said decree, the State of Wyoming was found by this Honorable Court to be entitled to an amount of water for the purpose of irrigating lands in said state far in excess of the amount of water to which

the State of Colorado was entitled, for the purpose of irrigating lands in the State of Colorado; and therefore has a vital interest in the appropriation, diversion and measurement of the waters of the Laramie river and its tributaries in Colorado, and should therefore be permitted to install its own standard gauging devices and make its own measurements of diversion of water from said Laramie River and its tributaries in Colorado; yet Colorado, though requested in writing by Wyoming for such permission, denied such request; and that, therefore, all allegations herein as to the measurements of water and the quantities are necessarily dependent on the gauging devices and measurements and records thereof as kept by Colorado and its officials.

ELEVENTH

That the State of Colorado has, in the manner and by the means hereinafter alleged, violated and disregarded said decree and the terms thereof; and the injunction therein contained against the excessive or otherwise unlawful diversions, of water, as hereinafter described;

TWELFTH

That during the following years there was diverted in the State of Colorado by its officials, agents, representatives, and other citizens and residents, by and with the knowledge, consent, permission, and cooperation of the said State of Colorado, and its officials, agents, representatives and servants, from the Laramie River and its tributaries in Colorado, to the Cache La Poudre River, for the irrigation of lands in Colorado, the following amounts of water in excess of the 18,000 acre-feet of water, being the amount authorized so to be diverted under said decree of this Honorable Court by said Skyline Ditch, to-wit:

(1) During the year 1927, 22,150 acre-feet of water, or 4,150 acre-feet in excess of the annual amount of water authorized by said decree thus to be diverted;

(2) During the year 1928, 19,397 acre-feet of water, or 1,397 acre-feet in excess of the annual amount of water authorized by said decree thus to be diverted;

(3) During the year 1929, 24,363 acre-feet of water, or 6,363 acre-feet of water in excess of the annual amount authorized by said decree thus to be diverted.

THIRTEENTH

That during the following years there was diverted in the State of Colorado by its officials, agents, representatives, and other citizens and residents, and corporations, by and with the knowledge, consent and cooperation of the said State of Colorado, and its officials, agents, representatives and servants, from the Laramie River and its tributaries in Colorado, the following amounts of water in excess of the amount authorized under said decree to be diverted for the purpose of irrigating 4,250 acres of meadow land in the State of Colorado:

(1) During the year 1926, 61,767 acre-feet of water, or 57,517 acre-feet of water in excess of the annual amount authorized by said decree thus diverted, which was used to irrigate 6,162 acres of natural hay meadows.

(2) During the year 1927, 54,152 acre-feet of water, or 49,902 acre-feet of water in excess of the annual amount authorized by said decree thus diverted, which was used to irrigate 5,517 acres of natural hay meadows.

(3) During the year 1928, 56,275 acre-feet of water, or 52,025 acre-feet of water in excess of the annual amount authorized by said decree thus diverted, which was used to irrigate 6,767 acres of natural hay meadows.

(4) During the year 1929, 58,772 acre-feet of water, or

54,522 acre-feet of water in excess of the annual amount authorized by said decree thus diverted, which was used to irrigate 6,792 acres of natural hay meadows.

FOURTEENTH

That in addition to the excessive and unlawful diversions in violation of said decree of this Honorable Court, as above alleged, the State of Colorado, by its officials, agents and servants, and by and with the knowledge, consent and cooperation of the said State of Colorado, and its officials, agents and servants, has permitted the following unlawful and/or excessive trans-mountain diversions of water to be made from the Laramie River and its tributaries in Colorado through the Bob Creek ditch; Lost Lake Reservoir System; Columbine ditch; the Deadman Ditch Feeder or Wilson Supply Ditch; the Divide ditch; and the Deadman Extension Ditch; to the watershed of the Cache La Poudre River for the irrigation of lands in Colorado, contrary to and in violation and disregard of the terms of said decree of this Honorable Court, as follows:

1. The Bob Creek ditch as constructed, heads north fifty-eight degrees fifty-six minutes west three thousand and five (3005) feet from the quarter corner between sections three and ten, in township nine north of range seventy-five west of the sixth principal meridian; that from this point it has a northeasterly course to near the center of section three; thence in a southeasterly course through the southeast quarter of section three and the southwest quarter of the southwest quarter of section two; thence in a southeasterly course through the north one-half of section eleven in said township and range, emptying into Roaring Fork, a Colorado tributary of the Cache La Poudre River, in the southwest quarter of the northeast quarter of section eleven, in said township and range; that the length of the

ditch is two and one-half miles, that the cross section shows a bottom width of four feet capable of carrying two feet depth of water, eight feet wide at two-foot water level; that it has a fall of five feet per mile, with an approximate carrying capacity of thirty-six second feet of water;

2. That a small ditch eight hundred (800) feet long has been constructed across a marsh to divert water into Bob Creek Ditch about the southeast quarter of the northwest quarter of section eleven, township nine north of said range; that the sources of supply of said Bob Creek ditch are several tributaries of Nunn Creek, and that the water then flows into Roaring Fork Creek, a tributary of the Cache La Poudre River; and thus the water is thereby unlawfully diverted from the Laramie River and its tributaries into the Cache La Poudre watershed for the irrigation of lands in Colorado, contrary to and in violation and disregard of the terms of the said decree of this Honorable Court; and that the records of such unlawful diversions as kept by Colorado officials are as follows:

(1) In the year 1922, 512 acre-feet
(2) In the year 1923, 1174 acre-feet
(3) In the year 1924, 0 acre-feet
(4) In the year 1925, 745 acre-feet
(5) In the year 1926, 0 acre-feet
(6) In the year 1927, 1044 acre-feet
(7) In the year 1928, 535 acre-feet
(8) In the year 1929, 1153 acre-feet

That there is also an unfinished extension ditch to said Bob Creek ditch:

3. The Columbine ditch is located in sections twenty-six and thirty-five, township ten north of said range, in the State of Colorado; that the length of the ditch is one and three-tenths (1.3) miles; that the ditch has an average cross section of four-foot bottom, six feet at water level, with a

depth of two feet, and a slope of five feet per mile; that its approximate carrying capacity is thirty second feet; that its source of supply is Columbine Creek or a branch of it being tributaries of the Laramie River; that the greater part of the water being carried by it is the early run-off; that the water from the said Columbine ditch is discharged into a branch of the North Poudre river, and thence into the Poudre River watershed, for the irrigation of lands in Colorado, contrary to and in violation and disregard of the terms of the said decree of this Honorable Court; and that the records of such unlawful diversions have been kept by the officials of Colorado, as follows:

(1) In the year 1922, 181 acre-feet;
(2) In the year 1923, 332 acre-feet;
(3) In the year 1924, 0 acre-feet;
(4) In the year 1925, 259 acre-feet;
(5) In the year 1926, 0 acre-feet;
(6) In the year 1927, 376 acre-feet;
(7) In the year 1928, 373 acre-feet;
(8) In the year 1929, 590 acre-feet;

4. The Lost Lake system is composed of five lakes: Lost Lake, Laramie Lake, Lily Lake, and the Twin Lakes; but that three of such lakes only are used for storing water, to-wit: Lost Lake, Laramie Lake and Lily Lake; their capacity being 806 acre-feet of water:

(1) Lost Lake, which is located in the northeast quarter of section six, in township seven north of said range, and in the southeast quarter of section thirty-one in township eight north of said range;

(2) Laramie Lake, which is located in the northwest quarter of the southwest quarter, and the southwest quarter of the northwest quarter of section thirty-two, in township eight north of said range; that a ditch has been constructed in order that the water from the Lar-

amie Lake will flow into Lost Lake, and thence into Chambers Lake situated at the head of the Cache La Poudre River, into which river it flows;

(3) Lily Lake, which is located near the center of section twenty-nine, in township eight north of said range; that the water from Lily Lake flows down a natural channel to Laramie Lake;

(4) Twin Lakes, which are located in the northwest quarter of section twenty-nine, in township eight north of said range; that such lakes have no dike to hold water as the other three lakes of the Lost Lake system have; but a ditch has been constructed to drain these lakes which flows into a natural channel into Laramie Lake;

(5) That the sources of supply of said Lost Lake system are unnamed tributaries of the Laramie River; and that the water flows therefrom into said Chambers Lake; that all the water stored in these lakes would flow into the Laramie River if the dams and ditches did not cause the water to flow into Chambers Lake, thence into the Cache La Poudre River; and thus the water is thereby unlawfully diverted from the Laramie River and its tributaries into the Cache La Poudre watershed for the irrigation of lands in Colorado, contrary to and in violation and disregard of the terms of the said decree of this Honorable Court; and that the only record of the water diverted by the officials of Colorado shows that in the year 1926, 448 acre-feet were thus unlawfully diverted;

5. The Deadman Ditch Feeder, or Wilson Supply Ditch, has its headgate in the southeast quarter of section fifteen, township ten north of said range; and runs in a northwesterly course; is one and three-tenths (1.3) miles long, with

a five-foot fall per mile; has a cross section of eight-foot bottom, three feet depth of water, thirteen feet across at water level, carrying capacity of approximately one hundred and thirty second-feet; its main source of water is Deadman Creek or a tributary to it; and the water flows through this ditch into Sand Creek, and from Sand Creek is diverted by the Divide ditch, sometimes also known as the Wilson Supply ditch, into Sheep Creek, a tributary of the North Cache La Poudre River, which flows into the Cache La Poudre River, for the irrigation of lands in Colorado;

6. The Deadman Extension ditch is an extension of the Deadman ditch Feeder or Wilson Supply ditch, running to the south to intercept several small streams; that it extends from the Deadman Feeder ditch in the southwest quarter of section fourteen, in township ten north of said range, in a general southerly direction through the east half of section twenty-two and the west half of section twenty-three, diverting water from two small streams in the west half of said section twenty-three; and the ditch is extended a short distance beyond the point where the water is diverted in the southwest quarter of said section twenty-three.

7. That an examination of said Deadman Extension ditch in 1929 disclosed that a survey of the ditch had been made for an enlargement; the slope stakes being set for enlarging the ditch from a three-foot bottom to a six-foot bottom; that the point where the enlargement stakes were set was north thirteen degrees east six hundred feet from the southwest corner of section fourteen, in township ten north of said range; thence in a southwesterly course thirty-two hundred feet; thence in a southeasterly course about twenty-four hundred feet to a branch of Deadman Creek; passing through the southwest quarter of the southwest quarter of section fourteen; thence through the southeast

quarter of the southeast quarter of section fifteen; thence through the northeast quarter of section twenty-two, ending in the southwest quarter of the northwest quarter of section twenty-three; all in said township ten north of said range;

8. That an enlargement based on such survey was made in the fall of 1929; and in 1930 it was disclosed that said ditch had been recently constructed to a six-foot bottom; that the ditch can, as reconstructed and enlarged, carry a two-foot depth of water with a two-foot freeboard; that the slope or fall per mile is approximately five feet; that the ditch is capable of carrying forty-eight second feet of water; that part of the ditch carrying water last year has not been enlarged this year.

FIFTEENTH

That in and by the Decree of this Honorable Court, as heretofore alleged, it was provided that said decree should not prejudice the right of the State of Colorado, or of anyone recognized by her as duly entitled thereto, to continue to exercise the right then existing and thereby recognized to divert and take from such stream (Laramie) and its tributaries the relatively small amount of water appropriated from the headwaters of Deadman Creek, a Colorado tributary of the Laramie River, prior to the year 1902, by and through what is designated in the evidence as the Wilson Supply Ditch; that insofar as said extension and enlargement of said Wilson Supply Ditch, otherwise known as the Deadman Feeder ditch to the Wilson Supply Ditch, together with the Divide Ditch, divert more than the relatively small amount of water appropriated from the headwaters of Deadman Creek, prior to the year 1902, by and through what was designated in said decree as the Wilson Supply ditch, such enlargement has been done contrary to

and in violation and disregard of the decree of this Honorable Court, and for the purpose of increasing the amount of water thus diverted.

SIXTEENTH

That there are pending at this time in the district court of Larimer County, Colorado, applications filed July 12, 1926 on behalf of the Water Supply and Storage Company, as owner, of said Laramie Lake, Lost Lake and Lily Lake, referred to therein as reservoirs, for the purpose of having decreed to said owner, authority under the laws of Colorado, to divert and store water for irrigation purposes in said reservoirs; in the amount and capacity in the petitions filed therein set forth; the petitions alleging further that said Laramie reservoir has an area of forty-seven acres, and an estimated capacity of 14,817,744 cubic feet of water; that said Lost Lake reservoir has an area of twenty-six acres, and an estimated capacity of 12,541,030 cubic feet of water; that said Lily Lake reservoir has an area of fifty-nine and five-tenths acres, and an estimated capacity of 7,747,189 cubic feet of water;

SEVENTEENTH

That there is also pending in the said district court of Larimer County, Colorado, the application filed July 12, 1926 of the Mountain and Plains Irrigation Company, owner of the Bob Creek ditch, for the purpose of having decreed to it an adjudication of priority to waters to be diverted from the Laramie River Basin by means of said Bob Creek ditch diversion, sometimes known as Nunn Creek ditch, said petition alleging as follows: That said ditch begins in section three and ends in section two, in township nine north of said range; that it is eight thousand one hundred

and thirty feet (8130) long, with a carrying capacity of one hundred cubic feet per second of time; that as a part of said Bob Creek ditch, a feeder ditch was constructed, located in said section two; and also that the Bob Creek Extension ditch across the channel of said Bob Creek, also sometimes known as Nunn Creek ditch, is completed to a distance of approximately six thousand feet, and has a carrying capacity of fifty cubic feet per second of time; and that said Bob Creek ditch and said Bob Creek Extension ditch are used for the irrigation of agricultural lands in the counties of Larimer and Weld in the State of Colorado, the number of acres not being alleged; and that said applications for said decrees are now pending before referees.

EIGHTEENTH

That a topographical map of the watershed of the Laramie river and its tributaries in Colorado, showing the location of the diversions, described herein, is attached hereto, marked "Exhibit A" and hereby expressly made a part hereof;

NINETEENTH

That officials of the State of Wyoming, charged with the supervision of the waters of the state and of their appropriation, diversion and distribution, have conferred with like officials of the State of Colorado, and have protested orally against such excessive or otherwise unlawful diversions of water from the Laramie River and its tributaries in Colorado, for the irrigation of lands in Colorado, contrary to and in violation and disregard of said decree of this Honorable Court; but such officials of Colorado have denied that any such excessive or otherwise unlawful diversions existed; and that such officials in Wyoming further protested in writing to the said officials of Colorado against

such excessive and otherwise unlawful diversions; and such officials of Colorado replied in writing that they were unable to find that Colorado or her citizens had violated the decree of this Honorable Court, and were at all times willing and anxious to abide by the terms thereof, and requested a conference of such officials, which was accordingly held on September 26th, A. D. 1930; and that at such conference the assertion on behalf of Wyoming, of such excessive and otherwise unlawful diversions of water by and on behalf of Colorado, as herein alleged, was denied by and on behalf of Colorado; and that, therefore, your complainant is without relief from such excessive and otherwise unlawful diversions of water, except through and by the order, judgment and decree of this Honorable Court.

TWENTIETH

That furthermore, the State of Colorado, unless restrained by this Honorable Court, will, through its officials, agents, representatives, servants, or other citizens or residents, or its corporations, continue to increase the diversion of water from the Laramie River and its tributaries for the irrigation of lands in Colorado; and unless restrained, will continue until the amount of water determined by the decree of this Honorable Court as being available to Wyoming for the water users in Wyoming, to-wit: 272,500 acre-feet, will be gradually reduced and finally consumed, and Wyoming and its citizens, residents and corporations will be deprived of any protection under the said decree to the use of the waters to which it was determined by said decree to be entitled, and that annually since the entry of said decree, the amount of water available to the State of Wyoming for its water users has been less than said 272,500 acre-feet of water per annum; caused by reason of said excessive and otherwise unlawful diversions;

TWENTY-FIRST

Your complainant, the State of Wyoming, offers to do full and complete equity to the State of Colorado in respect to the administration, diversion and use of the waters of the Laramie River and its tributaries; but this complainant alleges that no other court than this Honorable Court, upon the general doctrines of law, or the constitution of the United States, or under the specific adjudication and decree and the governing principles set forth in the said case of Wyoming vs. Colorado, et al., has any authority or jurisdiction whatsoever to adjudicate upon the matters which were adjudicated in said decree in said case; and furthermore, that Colorado, and through it, its officials, agents, representatives, servants, and other citizens and residents, and its corporations, should be required by this Honorable Court to abide by the terms of said decree, and be prevented by this Honorable Court from any violation of the terms thereof.

TWENTY-SECOND

Your complainant has no adequate remedy at law, nor any remedy at law, nor any remedy in any court whatsoever, except this Supreme Court of the United States, in respect to the matters and things herein set forth and alleged.

Second Cause of Action

The State of Wyoming by William O. Wilson, Attorney General of the State, under the direction of the Honorable Frank C. Emerson, Governor of the State, and in compliance with the request of the Honorable John A. Whiting, State Engineer of the State and its Commissioner charged with authority in relation to interstate streams, by leave of this Honorable Court first had and obtained, brings this its original bill of complaint, in its own behalf and that of its officials, agents, servants, and other citizens and residents and corporations, against the State of Colorado, in its own behalf, and that of its officials, agents, servants, representatives and other citizens, residents and corporations, and respectfully and fully sets forth and alleges as and for its second cause of action:

FIRST

Complainant refers to all matters and things alleged and set forth in paragraphs numbered first to twenty-first both inclusive of this petition, and makes all of the said matters and things alleged in said paragraphs numbered first to twenty-first both inclusive of said first cause of action, a part of this its second cause of action, with the same effect and to all intents and purposes, as though herein specifically set forth and alleged herein.

SECOND

That the State of Wyoming made request on March 8, 1928, in writing, of the State of Colorado for permission to install measuring devices in order to make an inventory of such waters in Colorado, jointly with Colorado and with the United States Geological Survey, such inventory to be made

by Wyoming, at its own expense; but that this request was denied in writing on April 5, 1928, by the State of Colorado, and that by reason of such refusal, Wyoming, with a greater interest than Colorado in the said waters of the Laramie River watershed, by virtue of the said decree of this court, is compelled to rely on the measurements made by Colorado.

THIRD

That, therefore, the State of Wyoming should be permitted by means of the order of this Honorable Court, to install gauging devices in the State of Colorado, in the Laramie River and its tributaries and in any transmountain ditches, lakes and reservoirs by means of which water is being or may be diverted from said Laramie River and its tributaries in the State of Colorado to the Poudre River basin; and to take any and all measurements therefrom for the purpose of ascertaining the amount of water being appropriated and diverted from said Laramie River and its tributaries, for the irrigation of lands in Colorado, or that such installation of gauges, and measuring of such waters should be carried on by the Federal Government, at the expense of the said states.

FOURTH

Your complainant, the State of Wyoming, offers to do full and complete equity to the State of Colorado in respect to the matters and things in this cause of action alleged.

FIFTH

Your complainant has no adequate remedy at law, or any remedy at law, nor any remedy in any court whatsoever except this Supreme Court of the United States in respect to the matters and things herein set forth and alleged.

WHEREFORE the State of Wyoming prays as to its first and second causes of action herein that this Honorable Court may cause its subpoena or other proper process to issue under the seal of this Court, summoning the State of Colorado, as defendant to appear herein, present its answer, if any, and abide by the determination of this Court; and that this Honorable Court may exercise its sole jurisdiction over the determination of the use of the waters of the Laramie river and its tributaries, and protect and quiet the rights of the State of Wyoming, its officers, agents, representatives or other citizens and residents, and its corporations, under the adjudication and decree in said case of Wyoming vs. Colorado, et al.; and also that the State of Wyoming be permitted to install standard gauging devices, and take any and all such requisite measurements of water, and make records thereof, as heretofore alleged; or that such installation of gauges and measuring and recording of such waters be carried on by the Federal Government, and that in the event the said court shall find in and by said decree that the injunction entered therein applied only to the diversion by the State of Colorado of the waters through the Laramie-Poudre Tunnel, that this Honorable Court may, temporarily, during the pendency of this cause, and permanently, on the final determination hereof, enjoin the said State of Colorado, and through it or otherwise, as the court may determine, its officers, agents, representatives or servants, or other persons or citizens and its corporations, from diverting any water from said Laramie River and its tributaries in Colorado,

for the irrigation of lands in Colorado, in excess of the available quantities of water allotted to Colorado in and by said decree; or from further adjudication thereon in the Courts of Colorado; and that this Honorable Court give and grant such other full, further, or different relief as may be just and equitable.

THE STATE OF WYOMING

By WILLIAM O. WILSON
Attorney General of the State of Wyoming.
JAMES A. GREENWOOD
Deputy Attorney General.
RICHARD J. JACKSON
Assistant Attorney General.
PHILIP S. GARBUTT
Assistant Attorney General.

Solicitors for Complainant

THE STATE OF WYOMING }
COUNTY OF LARAMIE } ss.

William O. Wilson, being duly sworn, on his oath, according to law, deposes and says: That he is the Attorney General of the State of Wyoming, and as such at the direction and upon the request of the Governor of said state, and upon the request of the State Engineer and Commissioner for Wyoming, exhibits the foregoing bill of complaint; that he has read the said bill of complaint, and that the facts therein set forth, saving and excepting those averred on information and belief, are true; and that as to the facts therein alleged as upon information and belief, affiant is credibly informed and verily believes that the said facts are true.

WILLIAM O. WILSON

Subscribed in my presence and sworn to before me this 1st day of October, A. D. 1930.

My commission expires March 10, 1931.

MABEL C. KNAPP,
Notary Public.

(NOTARIAL SEAL)

In the Supreme Court of the United States
In Equity

October Term, 1930

No.....

THE STATE OF WYOMING, *Complainant,*
vs.
THE STATE OF COLORADO, *Defendant.*

Notice:

To the State of Colorado, defendant herein; and to the Honorable John S. Underwood, Attorney General of the said State, and Solicitor for said defendant:

You will please take notice that at the incoming of the Supreme Court of the United States, at the capitol building, in the City of Washington, District of Columbia, at 12:00 o'clock noon, on October 6th, A. D. 1930, or as soon thereafter as solicitors can be heard, the above named complainant, the State of Wyoming, will appear by its solicitors, and present to said court, the motion of complainant, with its complaint attached thereto, against the above named defendant, the State of Colorado; and ask leave of court to file said complaint; and if the said motion be granted, will thereupon file its said complaint in the office of the Clerk of said Court; a copy of which said motion and of said complaint are presented herewith; when and where you may be present if you so desire.

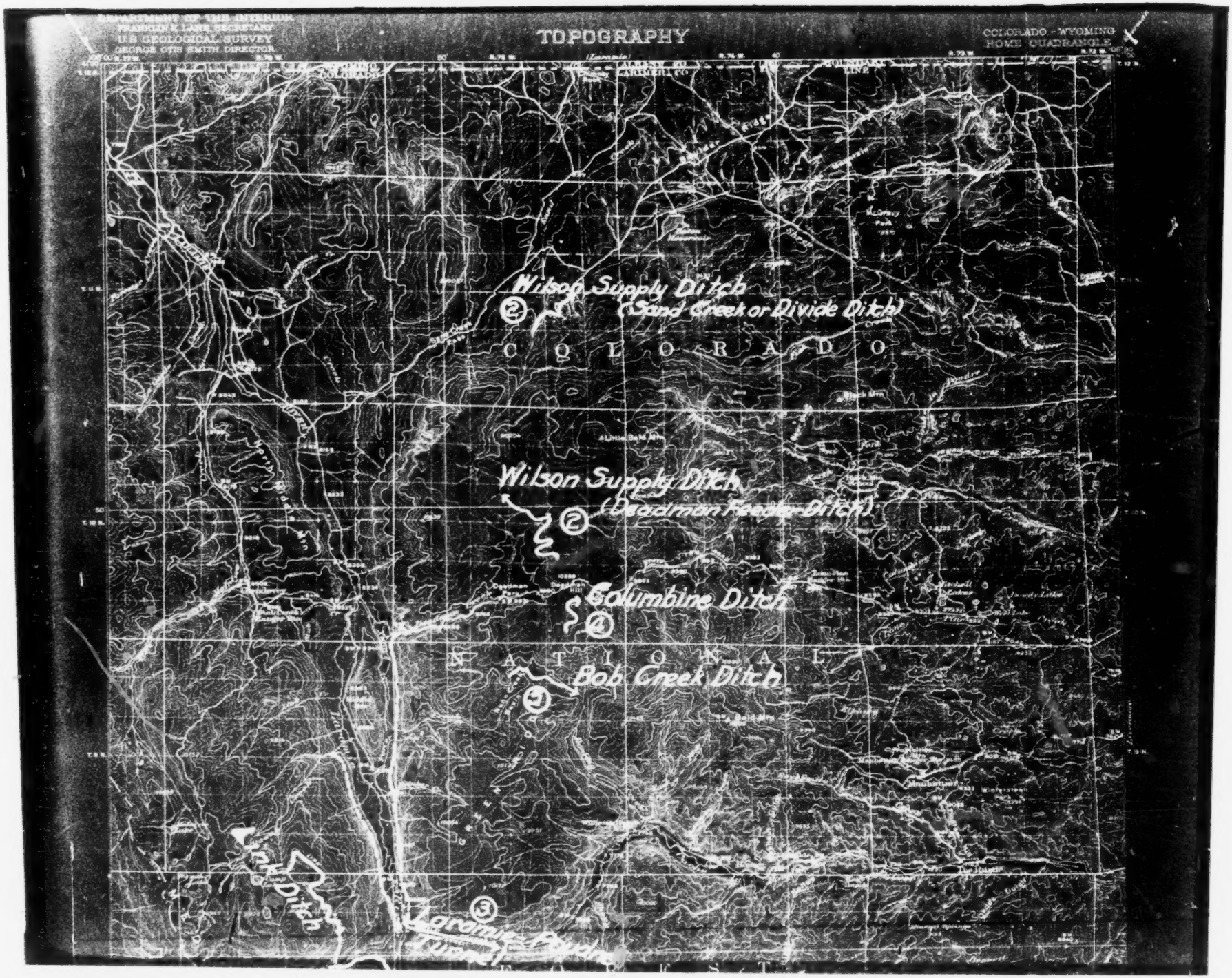
Dated this October 1st, A. D. 1930.

WILLIAM O. WILSON,
Attorney General of Wyoming, and solicitor for complainant
JAMES A. GREENWOOD,
Deputy Attorney General, and solicitor for complainant

STATE OF COLORADO, }
CITY AND COUNTY OF DENVER } ss.

Service of the foregoing notice, by the delivery to me of a copy thereof, together with a copy of the motion and of the complaint therein mentioned, is hereby acknowledged, this 2nd day of October, A. D. 1930.

.....
Attorney General of Colorado, and solicitor for defendant.


TOPOGRAPHY
COLORADO - WYOMING
HOME QUADRANGLE
Wilson Supply Ditch
(Sand Creek or Divide Ditch)
2
C O L O R A D O
Wilson Supply Ditch
(Deadman Feeder Ditch)
2
Columbine Ditch
4
N A T I O N A L
Bob Creek Ditch
1
3

LEGEND
1. Skyline or Laramie River Ditch
2. Wilson Supply or Sand Creek System
3. Laramie-Poudre Tunnel
4. Columbine Ditch
5. Bob Creek Ditch
6. Last Lake System
Ditches Constructed
Ditches Partly Constructed
Twin Lakes
Lily Lake
Laramie Lake
Last Lake
Skyline Ditch
Laramie River Ditch
ARAPAHO NATIONAL FOREST
FOREST
Crown Point
Scale 1:20000
Contour interval 100 feet
HOME

FILE COPY

Office Supreme Court, U. S.
FILED
JUN 30 1932
CHARLES ELMORE CROPLEY
Clerk

In the
Supreme Court of the United States
In Equity

OCTOBER TERM, 1931

No. 5 10

THE STATE OF WYOMING, *Complainant*,
vs.
THE STATE OF COLORADO, *Defendant*

AMENDED ORIGINAL BILL OF COMPLAINT IN EQUITY

JAMES A. GREENWOOD,
Attorney General of the State of Wyoming.

RICHARD J. JACKSON,
Deputy Attorney General.

GEORGE W. FERGUSON,
Assistant Attorney General.

R. DWIGHT WALLACE,
Assistant Attorney General.

Solicitors for Complainant.

In the
Supreme Court of the United States
In Equity

OCTOBER TERM, 1931

No.

THE STATE OF WYOMING,
Complainant,

vs.

THE STATE OF COLORADO,
Defendant.

Amended Original Bill of Complaint in Equity

To the Honorable, the Chief Justice and Associate Justices of the Supreme Court of the United States:

The State of Wyoming, by William O. Wilson, Attorney General of the State, under the direction of the Honorable Frank C. Emerson, Governor of the State, and in compliance with the request of the Honorable John A. Whiting, State Engineer of the State, and its Commissioner charged with authority in relation to interstate streams, by leave of this Honorable Court first had and obtained, brings this, its original bill of complaint, in its own behalf and that of its officials, agents, servants, and other citizens, residents and corporations, against the State of Colorado in its own behalf and that of its officials, agents, servants, representatives and other citizens, residents and corporations; and

In the
Supreme Court of the United States
In Equity

OCTOBER TERM, 1931

No......

THE STATE OF WYOMING,
Complainant,
vs.
THE STATE OF COLORADO,
Defendant.

Amended Original Bill of Complaint in Equity

To the Honorable, the Chief Justice and Associate Justices of the Supreme Court of the United States:

The State of Wyoming, by William O. Wilson, Attorney General of the State, under the direction of the Honorable Frank C. Emerson, Governor of the State, and in compliance with the request of the Honorable John A. Whiting, State Engineer of the State, and its Commissioner charged with authority in relation to interstate streams, by leave of this Honorable Court first had and obtained, brings this, its original bill of complaint, in its own behalf and that of its officials, agents, servants, and other citizens, residents and corporations, against the State of Colorado in its own behalf and that of its officials, agents, servants, representatives and other citizens, residents and corporations; and

respectfully sets forth and alleges, as its first cause of action, and permission having been granted by the Honorable Supreme Court of the United States so to do, complainant now, through its Attorney General, James A. Greenwood, files this, its amended bill of complaint:

FIRST

That your complainant is one of the states of the United States entitled to enjoy all the privileges, rights and powers, and with all the duties, including the duty of protecting the rights, interests and property of its citizens and residents possessed or devolved upon each and all of said states of the United States of America.

SECOND

That the State of Colorado is likewise one of the states constituting the United States of America entitled to enjoy all the privileges, rights and powers, and with all the duties, including the duty of protecting the rights, interests and property of its citizens and residents possessed and devolving upon each and all of said states of the United States of America.

THIRD

That on May twenty-ninth, A. D. 1911, an original suit in equity was instituted in this Honorable Court, by the above named complainant, the State of Wyoming, against the State of Colorado and the Greeley-Poudre Irrigation District and the Laramie-Poudre Reservoirs & Irrigation Company, to prevent a proposed diversion in Colorado of part of the waters of the Laramie River, an interstate stream; the opinion in said case rendered June 5, 1922, appearing in Vol. 259, U. S. Reports, page 419; 66 Law Edition, page 999; and the modified decree therein entered Oct. 9, 1922,

appearing in 260 U. S. Reports, page 1; 66 Law Edition, page 1026.

FOURTH

That it was found and determined in said case that the said Laramie is an unnavigable river which has its source in the mountains of northern Colorado, flows northerly twenty-seven miles in that state, crosses into Wyoming, and there flows northerly and northeasterly one hundred and fifty miles to the North Platte river, of which it is a tributary; and that both Colorado and Wyoming are in the arid region where flowing waters are, and long have been, commonly diverted from their natural channels and used in irrigating the soil and making it productive; and that for many years some of the waters of the Laramie river have been subjected to such diversion and use, part in Colorado and part in Wyoming.

FIFTH

That this Honorable Court further found the entire water supply available for the proposed Colorado appropriation and the Wyoming appropriations down to and including the diversion for the Wheatland district is 288,000 acre-feet per annum; and that there are some existing Colorado appropriations having priorities entitling them to precedence over many of the Wyoming appropriations; that these recognized Colorado appropriations are 18,000 acre-feet to be diverted by what is known as the Skyline ditch diversion, and 4,250 acre-feet for the irrigation of that number of acres of native-hay meadows in the Laramie valley in Colorado; and that these recognized Colorado appropriations, aggregating 22,250 acre-feet, were not to be deducted from the 288,000 acre-feet, that being the available annual supply after they are satisfied; and that thus the total available

annual supply of water for irrigation, in Wyoming and Colorado out of the waters of the Laramie River and its tributaries, was said 288,000 acre-feet of water, and said 22,250 acre-feet of water; or a total available annual supply of water for irrigation of lands in Colorado and Wyoming from the Laramie River and its tributaries in the total sum of 310,250 acre-feet of water; in addition to the waters of Sand Creek, which rises in Colorado and extends into the Laramie plains in Wyoming, and discharges into Hutton Lake, a few miles from the Laramie River, and the waters of which creek, for reasons stated in the opinion, were not regarded by this Honorable Court as a factor in the controversy;

SIXTH

That this Honorable Court further found and determined that the evidence showed that the Wyoming appropriations having priorities senior to the one in Colorado, and which are dependent on the available water supply before named, cover 181,500 acres of land, and that the amount of water appropriated and reasonably required for the irrigation of said lands is 272,500 acre-feet; that a much larger amount was claimed, but the findings of the court restricted the amount to what the evidence showed was reasonably required; and that as the available supply is 288,000 acre-feet, and the amount covered by senior appropriations in Wyoming is 272,500 acre-feet, there remains 15,500 acre-feet which are subject to the junior appropriation in Colorado, to-wit; the Laramie-Poudre Tunnel appropriation.

SEVENTH

That in and by its final decree, this Honorable Court then considered, ordered and decreed, that the defendants, their officers, agents and servants be, and they were thereby,

severally enjoined from diverting or taking from the Laramie River and its tributaries in the State of Colorado, more than fifteen thousand five hundred (15,500) acre-feet of water per annum, in virtue of or through what is designated in the pleadings and evidence as the Laramie-Poudre tunnel appropriation in that state; and provided therein that said decree should not prejudice the right of the State of Colorado, or of anyone recognized by her as duly entitled thereto, to continue to exercise the right existing and thereby recognized to divert and take from such stream and its tributaries in that state the following:

(1) Eighteen thousand (18,000) acre-feet of water per annum in virtue of and through said Skyline ditch appropriation in that state;

(2) Four thousand two hundred and fifty (4,250) acre-feet of water per annum in virtue of and through the meadow-land appropriations in that state;

(3) The relatively small amount of water appropriated from the headwaters of Deadman Creek, a Colorado tributary of the Laramie River, prior to the year 1902, by and through what is designated in the evidence as the Wilson Supply Ditch; and

(4) That the decree should not prejudice or affect the right of the State of Colorado or the State of Wyoming, or anyone recognized by either state as duly entitled thereto, to continue to exercise the right to divert and use water from Sand Creek, sometimes spoken of as a tributary of the Laramie River, by virtue of any existing and lawful appropriation of the waters of such creek.

EIGHTH

That plaintiff has been reliably informed, and therefore on information and belief alleges the fact to be that the gauging and measuring devices installed by the defendant

do not accurately gauge and measure the full amount of water diverted by means of and through the designated lawful diversions as defined in the said decree of this Honorable Court.

NINTH

That the State of Colorado, as your complainant is informed and believes, and therefore alleges the fact to be, has permitted water to be diverted from the Laramie River and its tributaries by means of and through the Laramie-Poudre tunnel diversion in excess of 15,500 acre-feet per annum; that during portions of the year 1926, there were, as shown by the official records of Colorado, diversions through said tunnel of 13,572 acre-feet, and unreported diversions through said tunnel in the amount of over 3,000 acre-feet, making a total diversion for the year 1926 in excess of the amount of 15,500 acre-feet as provided in said decree; that such measurements, on which complainant has relied, are from the records certified by the State Engineer of Colorado; based on records of the water commissioner of the district, who compiled the original record of measurements; that, however, the records of the division engineer, certified to by him, show the diversion of 5644 acre-feet, instead of 13,572 acre-feet, of water;

TENTH

That through, by and under said decree, the State of Wyoming was found by this Honorable Court to be entitled to an amount of water for the purpose of irrigating lands in said state far in excess of the amount of water to which the State of Colorado was entitled, for the purpose of irrigating lands in the State of Colorado; and therefore has a vital interest in the appropriation, diversion and measurement of the waters of the Laramie river and its tributaries

in Colorado, and should therefore be permitted to install its own standard gauging devices and make its own measurements of diversion of water from said Laramie River and its tributaries in Colorado; yet Colorado, though requested in writing by Wyoming for such permission, denied such request; and that, therefore, all allegations herein as to the measurements of water and the quantities are necessarily dependent on the gauging devices and measurements and records thereof as kept by Colorado and its officials.

ELEVENTH

That the State of Colorado has, in the manner and by the means hereinafter alleged, violated and disregarded said decree and the terms thereof; and the injunction therein contained against the excessive or otherwise unlawful diversions, of water, as hereinafter described;

TWELFTH

That during the following years there was diverted in the State of Colorado by its officials, agents, representatives, and other citizens and residents, by and with the knowledge consent, permission, and cooperation of the said State of Colorado, and its officials, agents, representatives and servants, from the Laramie River and its tributaries in Colorado, to the Cache La Poudre River, for the irrigation of lands in Colorado, the following amounts of water in excess of the 18,000 acre-feet of water, being the amount authorized so to be diverted under said decree of this Honorable Court by said Skyline Ditch, to-wit:

(1) During the year 1927, 22,150 acre-feet of water, or 4,150 acre-feet in excess of the annual amount of water authorized by said decree thus to be diverted;

(2) During the year 1928, 19,397 acre-feet of water, or 1,397 acre-feet in excess of the annual amount of water authorized by said decree thus to be diverted;

(3) During the year 1929, 24,363 acre-feet of water, or 6,363 acre-feet of water in excess of the annual amount authorized by said decree thus to be diverted.

THIRTEENTH

That during the following years there was diverted in the State of Colorado by its officials, agents, representatives, and other citizens and residents, and corporations, by and with the knowledge, consent and cooperation of the said State of Colorado, and its officials, agents, representatives and servants, from the Laramie River and its tributaries in Colorado, the following amounts of water in excess of the amount authorized under said decree to be diverted for the purpose of irrigating 4,250 acres of meadow land in the State of Colorado:

(1) During the year 1926, 61,767 acre-feet of water, or 57,517 acre-feet of water in excess of the annual amount authorized by said decree thus diverted, which was used to irrigate 6,162 acres of natural hay meadows.

(2) During the year 1927, 54,152 acre-feet of water, or 49,902 acre-feet of water in excess of the annual amount authorized by said decree thus diverted, which was used to irrigate 5,517 acres of natural hay meadows.

(3) During the year 1928, 56,275 acre-feet of water, or 52,025 acre-feet of water in excess of the annual amount authorized by said decree thus diverted, which was used to irrigate 6,767 acres of natural hay meadows.

(4) During the year 1929, 58,772 acre-feet of water, or 54,522 acre-feet of water in excess of the annual amount authorized by said decree thus diverted, which was used to irrigate 6,792 acres of natural hay meadows.

FOURTEENTH

That in addition to the excessive and unlawful diversions in violation of said decree of this Honorable Court, as above alleged, the State of Colorado, by its officials, agents and servants, and by and with the knowledge, consent and co-operation of the said State of Colorado, and its officials, agents and servants, has permitted the following unlawful and/or excessive trans-mountain diversions of water to be made from the Laramie River and its tributaries in Colorado through the Bob Creek ditch; Lost Lake Reservoir System; Columbine ditch; the Wilson Supply ditch, sometimes referred to as the Deadman Feeder Ditch; the Divide ditch; and the Deadman Extension Ditch; to the watershed of the Cache La Poudre River for the irrigation of lands in Colorado, contrary to and in violation and disregard of the terms of said decree of this Honorable Court, as follows:

1. The Bob Creek ditch as constructed, heads north fifty-eight degrees fifty-six minutes west three thousand five (3005) feet from the quarter corner between sections three and ten, in township nine north of range seventy-five west of the sixth principal meridian; that from this point it has a northeasterly course to near the center of section three; thence in a southeasterly course through the southeast quarter of section three and the southwest quarter of the southwest quarter of section two; thence in a southeasterly course through the north one-half of section eleven in said township and range, emptying into Roaring Fork, a Colorado tributary of the Cache La Poudre River, in the southwest quarter of the northeast quarter of section eleven, in said township and range; that the length of the ditch is two and one-half miles, that the cross section shows a bottom width of four feet capable of carrying two feet depth of water, eight feet wide at two-foot water level; that

it has a fall of five feet per mile, with an approximate carrying capacity of thirty-six second feet of water;

2. That a small ditch eight hundred (800) feet long has been constructed across a marsh to divert water into Bob Creek Ditch about the southeast quarter of the northwest quarter of section eleven, township nine north of said range; that the sources of supply of said Bob Creek ditch are several tributaries of Nunn Creek, and that the water then flows into Roaring Fork Creek, a tributary of the Cache La Poudre River; and thus the water is thereby unlawfully diverted from the Laramie River and its tributaries into the Cache La Poudre watershed for the irrigation of lands in Colorado, contrary to and in violation and disregard of the terms of the said decree of this Honorable Court; and that such unlawful diversions of water from the watershed of the Laramie River into the watershed of the Cache La Poudre River by means of and through the said Bob Creek Ditch have been in the following quantities, to-wit:

(1) In the year 1922, 512 acre-feet;
(2) In the year 1923, 1174 acre-feet;
(3) In the year 1924, 0 acre-feet;
(4) In the year 1925, 745 acre-feet;
(5) In the year 1926, 0 acre-feet;
(6) In the year 1927, 1044 acre-feet;
(7) In the year 1928, 535 acre-feet;
(8) In the year 1929, 1153 acre-feet;

and that in addition to said quantities of water so unlawfully diverted as hereinabove alleged, the defendant State of Colorado, through its officials, agents and servants, and by and with the knowledge, consent and cooperation of said State of Colorado and its officials, agents and servants, was, on the 17th day of June, A. D. 1932, diverting and permitting to be diverted from the watershed of the Laramie River

into the watershed of the Cache La Poudre River through said Bob Creek Ditch, water at the rate of 6.06 cubic feet per second;

That there is also an unfinished extension ditch to said Bob Creek Ditch;

3. The Columbine Ditch is located in sections twenty-six and thirty-five, township ten north of said range, in the State of Colorado; that the length of the ditch is one and three-tenth (1.3) miles; that the ditch has an average cross section of four-foot bottom, six feet at water level, with a depth of two feet, and a slope of five feet per mile; that its approximate carrying capacity is thirty second feet; that its source of supply is Columbine Creek or a branch of it, being tributaries of the Laramie River; that the greater part of the water being carried by it is the early run-off; that the water from the said Columbine Ditch is discharged into a branch of the North Poudre River, and thence into the Poudre River watershed, for the irrigation of lands in Colorado, contrary to and in violation and disregard of the terms of the said decree of this Honorable Court; that such unlawful diversions of water from the watershed of the Laramie River into the Cache La Poudre River by means of and through the Columbine Ditch, have been in the following quantities, to-wit:

(1) In the year 1922, 181 acre-feet;
(2) In the year 1923, 332 acre-feet;
(3) In the year 1924, 0 acre-feet;
(4) In the year 1925, 259 acre-feet;
(5) In the year 1926, 0 acre-feet;
(6) In the year 1927, 376 acre-feet;
(7) In the year 1928, 373 acre-feet;
(8) In the year 1929, 590 acre-feet;

and that in addition to said quantities of water so unlawfully diverted as hereinabove alleged, the defendant

State of Colorado, through its officials, agents and servants, and by and with the knowledge, consent and cooperation of said State of Colorado and its officials, agents and servants, was, on the 17th day of June, A. D. 1932, diverting and permitting to be diverted from the watershed of the Laramie River into the watershed of the Cache La Poudre River through said Columbine Ditch, water at the rate of 4.02 cubic feet per second.

4. The Lost Lake system is composed of five lakes: Lost Lake, Laramie Lake, Lily Lake, and the Twin Lakes; but that three of such lakes only are used for storing water, to-wit: Lost Lake, Laramie Lake and Lily Lake; their capacity being 806 acre-feet of water:

(1) Lost Lake, which is located in the northeast quarter of section six, in township seven north of said range, and in the southeast quarter of section thirty-one in township eight north of said range;

(2) Laramie Lake, which is located in the northwest quarter of the southwest quarter, and the southwest quarter of the northwest quarter of section thirty-two, in township eight north of said range; that a ditch has been constructed in order that the water from the Laramie Lake will flow into Lost Lake, and thence into Chambers Lake situated at the head of the Cache La Poudre River, into which river it flows;

(3) Lily Lake, which is located near the center of section twenty-nine, in township eight north of said range; that the water from Lily Lake flows down a natural channel to Laramie Lake;

(4) Twin Lakes, which are located in the northwest quarter of section twenty-nine, in township eight north of said range; that such lakes have no dike to hold water as the other three lakes of the Lost Lake system have; but a ditch has been constructed to drain these

lakes which flows into a natural channel into Laramie Lake;

(5) That the sources of supply of said Lost Lake system are unnamed tributaries of the Laramie River; and that the water flows therefrom into said Chambers Lake; that all the water stored in these lakes would flow into the Laramie River if the dams and ditches did not cause the water to flow into Chambers Lake, thence into the Cache La Poudre River; and thus the water is thereby unlawfully diverted from the Laramie River and its tributaries into the Cache La Poudre watershed for the irrigation of lands in Colorado, contrary to and in violation and disregard of the terms of the said decree of this Honorable Court; and that the only record of the water diverted by the officials of Colorado shows that in the year 1926, 448 acre-feet were thus unlawfully diverted;

(6) That the State of Colorado, by its officials, agents, and servants, and by and with the knowledge, consent and cooperation of said State of Colorado and its officials, agents and servants, was, on the 17th day of June, A. D. 1932, through and by means of Lost Lake, Laramie Lake and Lily Lake, being three of the five lakes constituting the Lost Lake System, unlawfully storing in said lakes, the waters collected from the watershed of the Laramie River with the purpose and intent to divert said stored waters from said lakes into Chambers Lake Reservoir and thence into the Cache La Poudre River.

5. The Wilson Supply Ditch, sometimes referred to as the Deadman Feeder Ditch, has its headgate in the southeast quarter of section fifteen, township ten north of said range; and runs in a northwesterly course; is one and three-

tenths (1.3) miles long, with a five-foot fall per mile; has a cross section of eight-foot bottom, three feet depth of water, thirteen feet across at water level, carrying capacity of approximately one hundred and thirty second-feet; its main source of water is Deadman Creek or a tributary to it; and the water flows through this ditch into Sand Creek, and from Sand Creek is diverted by the Divide ditch into Sheep Creek, a tributary of the North Cache La Poudre River, which flows into the Cache La Poudre River, for the irrigation of lands in Colorado;

6. The Deadman Extension Ditch is an addition to the Wilson Supply Ditch, sometimes referred to as the Deadman Feeder Ditch, running to the south to intercept several small streams; that it extends from the Wilson Supply Ditch in the southwest quarter of section fourteen, in township ten north of said range, in a general southerly direction through the east half of section twenty-two and the west half of section twenty-three, diverting water from two small streams in the west half of said section twenty-three; and the ditch is extended a short distance beyond the point where the water is diverted in the southwest quarter of said section twenty-three.

7. That an examination of said Deadman Extension ditch in 1929 disclosed that a survey of the ditch had been made for an enlargement; the slope stakes being set for enlarging the ditch from a three-foot bottom to a six-foot bottom; that the point where the enlargement stakes were set was north thirteen degrees east six hundred feet from the southwest corner of section fourteen, in township ten north of said range; thence in a southwesterly course thirty-two hundred feet; thence in a southeasterly course about twenty-four hundred feet to a branch of Deadman Creek; passing through the southwest quarter of the southwest quarter of section fourteen; thence through the southeast

quarter of the southeast quarter of section fifteen; thence through the northeast quarter of section twenty-two, ending in the southwest quarter of the northwest quarter of section twenty-three; all in said township ten north of said range;

8. That an enlargement based on such survey was made in the fall of 1929; and in 1930 it was disclosed that said ditch had been recently constructed to a six-foot bottom; that the ditch can, as reconstructed and enlarged, carry a two-foot depth of water with a two-foot freeboard; that the slope or fall per mile is approximately five feet; that the ditch is capable of carrying forty-eight second feet of water; that part of the ditch carrying water last year has not been enlarged this year.

FIFTEENTH

That in and by the decree of this Honorable Court, as heretofore alleged, it was provided that said decree should not prejudice the right of the State of Colorado, or of any one recognized by her as duly entitled thereto, to continue to exercise the right then existing and thereby recognized to divert and take from such stream (Laramie) and its tributaries the relatively small amount of water appropriated from the headwaters of Deadman Creek, a Colorado tributary of the Laramie River, prior to the year 1902, by and through what is designated in the evidence as the Wilson Supply Ditch; that prior to the year 1902, neither the defendant State of Colorado, nor anyone claiming under the laws of the State of Colorado, had an existing and lawful appropriation of water from the headwaters of Deadman Creek, a Colorado tributary of the Laramie River; and prior to the year 1902, neither the defendant State of Colorado, nor anyone claiming to be recognized by her as duly entitled thereto, diverted any water from said Deadman

Creek or any other recognized tributary of said Laramie River through said Wilson Supply Ditch; that there was not prior to the year 1902, and there is not now, an existing lawful appropriation of the waters of said Deadman Creek by and through said Wilson Supply Ditch into Sand Creek and thence into the Divide Ditch; that plaintiff, because no records are available to plaintiff showing the exact quantities of water diverted in Colorado by and through the Wilson Supply Ditch into Sand Creek, therefore, on information and belief, alleges the fact to be that said Wilson Supply Ditch, as a means of so diverting water from said Deadman Creek, has, as hereinbefore alleged, been enlarged and the capacity thereof increased and that by means thereof, continuing and additional quantities of water have been diverted during the twenty-five years last past from said Deadman Creek and from the area of said Laramie River watershed affected by said Wilson Supply Ditch in addition to the waters of Deadman Creek, that the defendant was, on the 20th day of June, A. D. 1932, by and through its officers, agents and servants, and with the defendant's knowledge, consent and cooperation, diverting and permitting to be diverted by and through the Sand Creek System, (including the Wilson Supply and Divide Ditch) the entire flow of said waters (approximately 43.75 cubic feet per second) of said Sand Creek in Colorado above the point of diversion from said Sand Creek into the Divide Ditch, thence through Sheep Creek into the Cache La Poudre Valley, including approximately, 25.02 cubic feet of water per second from the Laramie River watershed, including said Deadman Creek, through and by means of said Wilson Supply Ditch, and thus preventing any of the waters of said Sand Creek continuing in said stream to flow into the State of Wyoming for the benefit of those lawfully entitled to the use thereof in Wyoming; and that the water so unlawfully di-

verted by and through said Wilson Supply Ditch from the watershed of the Laramie River, constitutes a part of the 272,500 acre-feet which this Honorable Court found available for the irrigation of land within the State of Wyoming, and that said diversions by and through said Wilson Supply Ditch have contributed to the fact that Wyoming and its water users have been unable to obtain from said Laramie River, the amount of water, namely, 272,500 acre-feet, which this Honorable Court decreed was her equitable portion of said waters to be obtained in the manner as by said Court directed.

SIXTEENTH

That there are pending at this time in the district court of Larimer County, Colorado, applications filed July 12, 1926 on behalf of the Water Supply and Storage Company, as owner, of said Laramie Lake, Lost Lake and Lily Lake, referred to therein as reservoirs, for the purpose of having decreed to said owner, authority under the laws of Colorado, to divert and store water for irrigation purposes in said reservoirs; in the amount and capacity in the petitions filed therein set forth; the petitions alleging further that said Laramie reservoir has an area of forty-seven acres, and an estimated capacity of 14,817,744 cubic feet of water; that said Lost Lake reservoir has an area of twenty-six acres, and an estimated capacity of 12,541,030 cubic feet of water; that said Lily Lake reservoir has an area of fifty-nine and five-tenths acres, and an estimated capacity of 7,747,189 cubic feet of water;

SEVENTEENTH

That there is also pending in the said district court of Larimer County, Colorado, the application filed July 12, 1926 of the Mountain and Plains Irrigation Company, owner of the Bob Creek ditch, for the purpose of having decreed to it an adjudication of priority to waters to be diverted from the Laramie River Basin by means of said Bob Creek ditch diversion, sometimes known as Nunn Creek ditch; said petition alleging as follows: That said ditch begins in section three and ends in section two, in township nine north of said range; that it is eight thousand one hundred and thirty feet (8130) long, with a carrying capacity of one hundred cubic feet per second of time; that as a part of said Bob Creek ditch, a feeder ditch was constructed, located in said section two; and also that the Bob Creek Extension ditch across the channel of said Bob Creek, also sometimes known as Nunn Creek ditch, is completed to a distance of approximately six thousand feet, and has a carrying capacity of fifty cubic feet per second of time; and that said Bob Creek ditch and said Bob Creek Extension ditch are used for the irrigation of agricultural lands in the counties of Larimer and Weld in the State of Colorado, the number of acres not being alleged; and that said applications for said decrees are now pending before referees.

EIGHTEENTH

That a corrected topographical map of the watershed of the Laramie river and its tributaries in Colorado, showing the location of the diversions, described herein, is attached hereto, marked "Exhibit A" and hereby expressly made a part hereof;

NINETEENTH

That officials of the State of Wyoming, charged with the supervision of the waters of the state and of their appropriation, diversion and distribution, have conferred with like officials of the State of Colorado, and have protested orally against such excessive or otherwise unlawful diversions of water from the Laramie River and its tributaries in Colorado, for the irrigation of lands in Colorado, contrary to and in violation and disregard of said decree of this Honorable Court; but such officials of Colorado have denied that any such excessive or otherwise unlawful diversions existed; and that such officials in Wyoming further protested in writing to the said officials of Colorado against such excessive and otherwise unlawful diversions; and such officials of Colorado replied in writing that they were unable to find that Colorado or her citizens had violated the decree of this Honorable Court, and were at all times willing and anxious to abide by the terms thereof, and requested a conference of such officials, which was accordingly held on September 26th, A. D. 1930; and that at such conference the assertion on behalf of Wyoming, of such excessive and otherwise unlawful diversions of water by and on behalf of Colorado, as herein alleged, was denied by and on behalf of Colorado; and that, therefore, your complainant is without relief from such excessive and otherwise unlawful diversions of water, except through and by the order, judgment and decree of this Honorable Court.

TWENTIETH

That furthermore, the State of Colorado, unless restrained by this Honorable Court, will, through its officials, agents, representatives, servants, or other citizens or residents, or its corporations, continue to increase the diversion

of water from the Laramie River and its tributaries for the irrigation of lands in Colorado; and unless restrained, will continue until the amount of water determined by the decree of this Honorable Court as being available to Wyoming for the water users in Wyoming, to-wit: 272,500 acre-feet, will be gradually reduced and finally consumed, and Wyoming and its citizens, residents and corporations will be deprived of any protection under the said decree to the use of the waters to which it was determined by said decree to be entitled, and that annually since the entry of said decree, the amount of water available to the State of Wyoming for its water users has been less than said 272,500 acre-feet of water per annum; caused by reason of said excessive and otherwise unlawful diversions;

TWENTY-FIRST

Your complainant, the State of Wyoming, offers to do full and complete equity to the State of Colorado in respect to the administration, diversion and use of the waters of the Laramie River and its tributaries; but this complainant alleges that no other court than this Honorable Court, upon the general doctrines of law, or the constitution of the United States, or under the specific adjudication and decree and the governing principles set forth in the said case of Wyoming vs. Colorado, et al., has any authority or jurisdiction whatsoever to adjudicate upon the matters which were adjudicated in said decree in said case; and furthermore, that Colorado, and through it, its officials, agents, representatives, servants, and other citizens and residents, and its corporations, should be required by this Honorable Court to abide by the terms of said decree, and be prevented by this Honorable Court from any violation of the terms thereof.

TWENTY-SECOND

Your complainant has no adequate remedy at law, nor any remedy at law, nor any remedy in any court whatsoever except this Supreme Court of the United States, in respect to the matters and things herein set forth and alleged.

Second Cause of Action

The State of Wyoming by William O. Wilson, Attorney General of the State, under the direction of the Honorable Frank C. Emerson, Governor of the State, and in compliance with the request of the Honorable John A. Whiting, State Engineer of the State and its Commissioner charged with authority in relation to interstate streams, by leave of this Honorable Court first had and obtained, brings this its original bill of complaint, in its own behalf and that of its officials, agents, servants, and other citizens, residents and corporations, against the State of Colorado, in its own behalf, and that of its officials, agents, servants, representatives and other citizens, residents and corporations, and respectfully and fully sets forth and alleges as and for its second cause of action, and permission having been granted by the Honorable Supreme Court of the United States so to do, claimant now, through its Attorney General, James A. Greenwood, files this, its amended bill of complaint:

FIRST

Complainant refers to all matters and things alleged and set forth in paragraphs numbered first to twenty-first, both inclusive, of this petition, and makes all of the said matters and things alleged in said paragraphs numbered first to twenty-first, both inclusive, of said first cause of action, a part of this its second cause of action, with the same effect and to all intents and purposes, as though herein specifically set forth and alleged.

SECOND

That the State of Wyoming made request on March 8, 1928, in writing, of the State of Colorado for permission to install measuring devices in order to make an inventory of such waters in Colorado, jointly with Colorado and with the United States Geological Survey, such inventory to be made by Wyoming, at its own expense; but that this request was denied in writing on April 5, 1928, by the State of Colorado, and that by reason of such refusal, Wyoming, with a greater interest than Colorado in the said waters of the Laramie River watershed, by virtue of the said decree of this court, is compelled to rely on the measurements made by Colorado.

THIRD

That, therefore, the State of Wyoming should be permitted by means of the order of this Honorable Court, to install gauging devices in the State of Colorado, in the Laramie River and its tributaries and in any transmountain ditches, lakes and reservoirs by means of which water is being or may be diverted from said Laramie River and its tributaries in the State of Colorado to the Poudre River basin; and to take any and all measurements therefrom for the purpose of ascertaining the amount of water being appropriated and diverted from said Laramie River and its tributaries, for the irrigation of lands in Colorado, or that such installation of gauges, and measuring of such waters should be carried on by the Federal Government, at the expense of the said states.

FOURTH

Your complainant, the State of Wyoming, offers to do full and complete equity to the State of Colorado in respect to the matters and things in this cause of action alleged.

FIFTH

Your complainant has no adequate remedy at law, or any remedy at law, nor any remedy in any court whatsoever except this Supreme Court of the United States in respect to the matters and things herein set forth and alleged.

WHEREFORE the State of Wyoming prays as to its first and second causes of action herein that this Honorable Court summon the State of Colorado, as defendant to appear herein, present its answer, if any, and abide by the determination of this Court; and that this Honorable Court may exercise its sole jurisdiction over the determination of the use of the waters of the Laramie River and its tributaries, and protect and quiet the rights of the State of Wyoming, its officers, agents, representatives or other citizens and residents, and its corporations, under the adjudication and decree in said case of Wyoming vs. Colorado, et al.; and that the State of Wyoming be permitted to install standard gauging devices, and take any and all such requisite measurements of water, and make records thereof, as heretofore alleged; and that this Honorable Court direct the installation of necessary gauging devices for the recording of all waters diverted from the Laramie River under authority of the decrees of this Honorable Court; and that said gauging and measuring devices be supervised, maintained and operated under the direction, authority and control of the Federal Government; and that this Honorable Court prohibit any diversions of water from the Laramie River and its tributaries in excess of the quantities annually authorized to be diverted under the terms of said decrees; and that all diversion works and structures heretofore constructed in the State of Colorado for the diversion or storage of water on the Laramie River watershed other than for the diversion of the recognized appropriations, be ordered abated and said means of diversion and storage be ordered

removed; that the said State of Colorado, and through it or otherwise, as the court may determine, its officers, agents, representatives or servants, or other persons or citizens and its corporations, be permanently enjoined from diverting any water from said Laramie River and its tributaries in Colorado, for the irrigation of lands in Colorado, in excess of the quantities of water allotted to Colorado in and by the terms of said decrees; or from further adjudication thereon in the Courts of Colorado; and that this Honorable Court give and grant such other full, further, or different relief as may be just and equitable.

THE STATE OF WYOMING

By JAMES A. GREENWOOD,
Attorney General of the State of Wyoming.

RICHARD J. JACKSON,
Deputy Attorney General of the State of Wyoming.

GEORGE W. FERGUSON,
Assistant Attorney General of the State of Wyoming.

R. DWIGHT WALLACE,
Assistant Attorney General of the State of Wyoming.

Solicitors for Complainant.

THE STATE OF WYOMING }
COUNTY OF LARAMIE } ss.

JAMES A. GREENWOOD, being duly sworn on his oath according to law, deposes and says: That he is the Attorney General of the State of Wyoming, and as such, at the direction and upon the request of the Acting Governor of said State, and upon the request of the State Engineer and Commissioner for Wyoming, exhibits the foregoing amended bill of complaint; that he has read said amended bill of complaint and that the facts therein set forth, saving and excepting those averred on information and belief, are true; and that as to the facts therein alleged as upon information and belief, affiant is credibly informed and verily believes that said facts are true.

JAMES A. GREENWOOD

Subscribed in my presence and sworn to before me, this 22nd day of June, A. D. 1932.

My commission expires December 10, 1933.

W. S. FORSYTH,
Notary Public.

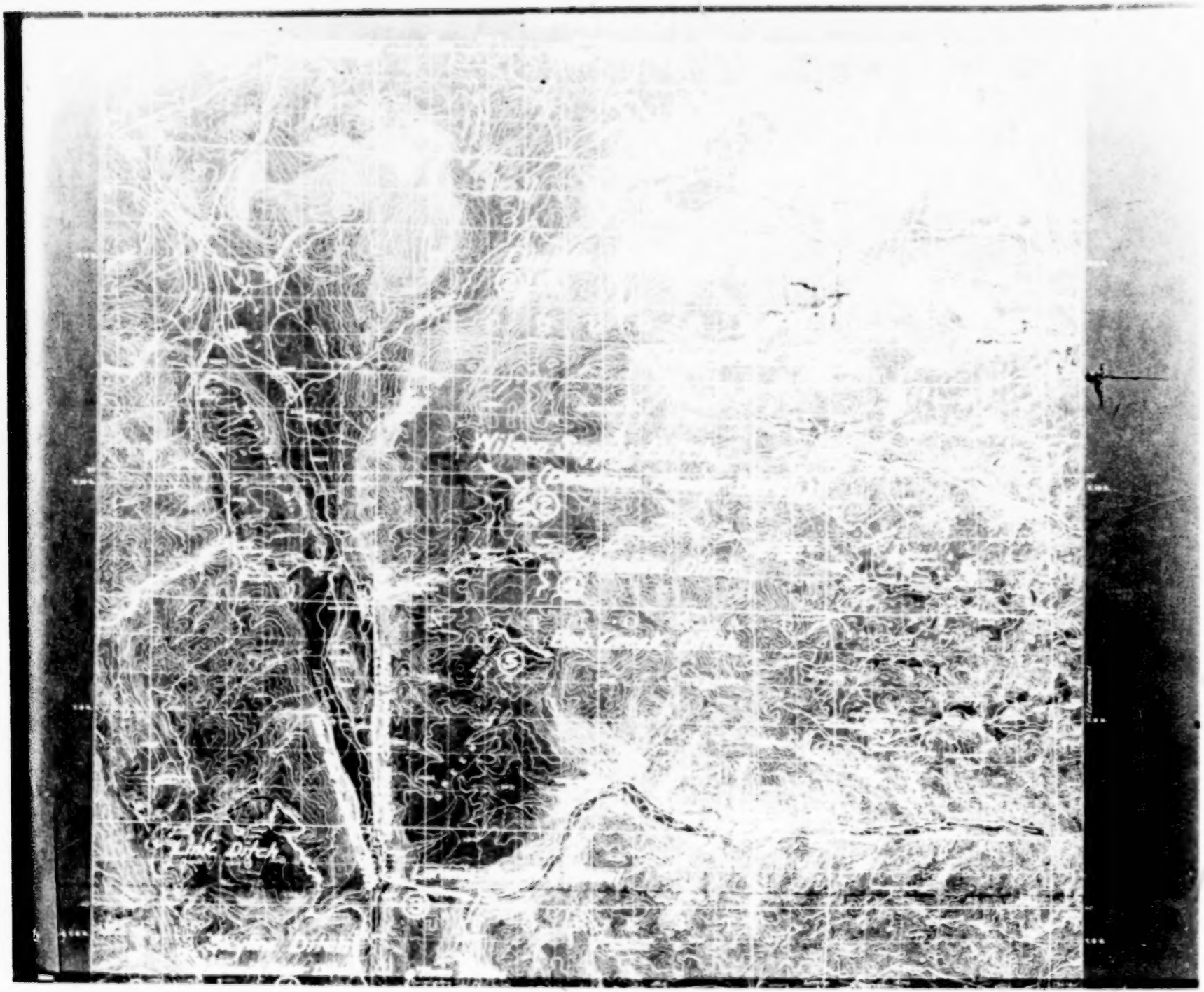
(NOTARIAL SEAL)

STATE OF COLORADO }
CITY AND COUNTY OF DENVER } ss.

SERVICE of a copy of the Amended Bill of Complaint in the case of State of Wyoming vs. State of Colorado, Original No. 15, is hereby acknowledged to have been received by me, this.....day of....., A. D. 1932.

.....

CLARENCE L. IRELAND,
Attorney General of Colorado, and
Solicitor for Defendant.


Link Ditch

FILE COPY

IN THE

Supreme Court of the United States

OCTOBER TERM, 1930

IN EQUITY

No. [redacted] Original.

THE STATE OF WYOMING,
Complainant,

vs.

THE STATE OF COLORADO,
Defendant.

MOTION TO DISMISS BILL OF COMPLAINT TOGETHER WITH NOTICE OF MOTION FOR LEAVE TO FILE.

C. D. TODD,
Greeley, Colorado;
WILLIAM R. KELLY,
Greeley, Colorado;
PAUL W. LEE,
Denver, Colorado;
GEORGE H. SHAW,
Denver, Colorado;
DONALD C. McCREERY,
Denver, Colorado;
WILLIAM A. BRYANS, III,
Fort Collins, Colorado;
LAWRENCE R. TEMPLE,
Fort Collins, Colorado;
Of Counsel.

CLARENCE L. IRELAND,
Attorney General of the State of Colorado,
CHARLES ROACH,
Deputy Attorney General,
FRED A. HARRISON,
Assistant Attorney General of the State of Colorado,
Attorneys for Defendant.

IN THE

Supreme Court of the United States

OCTOBER TERM, 1930.

IN EQUITY

No. 20, Original

THE STATE OF WYOMING,
Complainant,
vs.
THE STATE OF COLORADO,
Defendant.

NOTICE.

TO:

The State of Wyoming, the Complainant herein, and the Honorable James A. Greenwood, Attorney General of said State and Solicitor for said Complainant:

YOU WILL PLEASE TAKE NOTICE that at the incoming of the Supreme Court of the United States at the hour of 12:00 o'clock M. in the Capitol Building in the City of Washington, District of Columbia, on Monday, April 6, 1931 or as soon thereafter as Solicitors can be heard, the above named defendant will appear by its solicitors, ask leave to file a motion to dismiss the complaint; a copy of which Motion to Dismiss, together with a copy of the Brief in support there-

of is herewith served upon you. When and where you may be present if you so desire.

CLARENCE L. IRELAND,
Attorney General of the State of Colorado,
CHARLES ROACH,
Deputy Attorney General,
FRED A. HARRISON,
Assistant Attorney General of the State of Colorado,
Attorneys for Defendant.

State of Wyoming, County of Laramie, ss.

Service of the above Notice by delivery to me of a copy thereof, with a copy of the aforesaid Motion to Dismiss and Brief in support, is hereby acknowledged this .... day of April, 1931.

JAMES A. GREENWOOD,
Attorney General of the State of Wyoming and Solicitor for Complainant.

IN THE

Supreme Court of the United States

OCTOBER TERM, 1930.

IN EQUITY

No. 20, Original

THE STATE OF WYOMING, *Complainant,* vs. THE STATE OF COLORADO, *Defendant.*	MOTION TO DISMISS

Comes now the State of Colorado by its undersigned attorneys and respectfully moves that the Court do now dismiss the pending bill of complaint and each count thereof for want of equity apparent on the face of said bill, and for that the said bill does not state facts warranting the granting of the relief therein sought, or any relief, for the following reasons:

I.

That this Court has no jurisdiction of either the parties to or the subject matter of this suit, because it appears on the face of said bill of complaint that the matters set forth therein do not constitute, within the meaning of the constitution of the United States, any controversy between the State of Wyoming and the State of Colorado.

II.

That although the present bill purports to be supplemental to the bill filed in this Court in case No. 3, Original, State of Wyoming v. State of Colorado, and to have as its object the enforcement of the final decree entered by this Court in said suit, it fails sufficiently or at all to disclose any reason why any further decree is necessary to enforce said former decree, since the allegations of the present bill fail to show with certainty any violation of the provisions of said decree, and the allegations as to the supposed excessive diversions in the year 1926, through the Laramie-Poudre tunnel, are ambiguous and insufficient, and because if such alleged excessive diversions were made then the State of Wyoming has been and is guilty of laches in the premises.

III.

That the bill of complaint fails to show damage suffered by complainant or by its citizens with respect to any diversions alleged in said bill of complaint to have been unlawfully or excessively made.

IV.

That the allegations in Paragraphs 8 and 10 of the bill of complaint in support of the prayer for the installation by complainant of gauging devices and instruments in Colorado do not show that there is any uncertainty or difficulty in the ascertainment of the quantity of water diverted or carried through and by means of the Laramie-Poudre appropriation and tunnel, but said allegations have reference to other diversions not adjudicated or determined in and by the final decree of this Court in said former suit.

V.

That although the bill of complaint purports to be a supplemental bill for the enforcement of the former decree of this Court, in the case of State of Wyoming v. State of Colorado, it seeks greatly to extend the scope and effect of the decree entered in said case, to the end of undertaking a complete ad-

judication of the rights to the use of water from the Laramie River, under an asserted claim that as against the rights of water users in the State of Colorado, the priority of right of Wyoming appropriators as a class has been finally determined to be 272,500 acre-feet of water per annum, which asserted claim is without merit as does appear from the inspection of the record, opinions and decisions of this Court found in 259 U. S. 419 and 259 U. S. 496.

VI.

That said bill invites a construction of the former decree and seeks thereunder to extend the scope thereof to the adjudication of rights not therein litigated or determined, whereas said decree is not susceptible of such construction and no facts are alleged in support of the claimed interpretation of said decree, and such construction is inhibited by the 5th Amendment to the Constitution of the United States.

VII.

That the bill is multifarious in this, to-wit, that thereby the State of Wyoming seeks (1) a supplemental decree to enforce and carry into effect the decree heretofore renderd by this Court in said case No. 3, Original; (2) the claims of the State of Wyoming in its sovereign capacity and as representative of the separate and several claims of numerous undisclosed Wyoming appropriators of water against the separate and several claims of the numerous undisclosed Colorado appropriators of water; (3) to obtain relief with respect to alleged excessive diversions through and by means of the Laramie-Poudre diversion and tunnel in the year 1926; and (4) to obtain ancillary relief with respect to the installation, maintenance and inspection of certain gauging devices for measurement of water diverted and carried by means of all transmountain ditches and reservoirs.

VIII.

That it appears from the face of said bill that the acts complained of are not done by the State of Colorado nor under its authority, but by certain private corporations and individuals

with respect to whom relief is sought against the State of Colorado, and no decree which might be herein rendered would be efficacious to affect the vested rights of such corporations and individuals.

IX.

That said bill of complaint is in other respects uncertain and insufficient and does not state facts sufficient to entitle the said State of Wyoming to the equitable relief prayed for.

CLARENCE L. IRELAND,
Attorney General of the State of Colorado,
CHARLES ROACH,
Deputy Attorney General,
FRED A. HARRISON,
Assistant Attorney General of the State of Colorado,
Attorneys for Defendant State of Colorado.

C. D. TODD,
WILLIAM R. KELLY,
PAUL W. LEE,
GEORGE H. SHAW,
DONALD C. McCREERY,
WILLIAM A. BRYANS, III,
LAWRENCE R. TEMPLE,
Of Counsel.

We hereby certify that we are attorneys and of counsel for the defendant above named and that in our opinion the foregoing motion to dismiss the bill of complaint of said State of Wyoming is well founded and properly to be filed in the above cause.

CLARENCE L. IRELAND,
FRED A. HARRISON,
PAUL W. LEE,
Attorneys and of Counsel for Defendant State of Colorado.

United States of America, District of Colorado, ss.

Clarence L. Ireland, being first duly sworn, deposes and says that he is Attorney General of the State of Colorado, the defendant named in the foregoing Motion to Dismiss, and is authorized to verify the same on behalf of said defendant, and the foregoing Motion to Dismiss is not interposed to delay the cause or any proceeding therein.

CLARENCE L. IRELAND.

Subscribed and sworn to before me this 31st day of March, A. D. 1931.

My commission will expire August 7, 1934.

ELIZABETH D. PATTEN,
Notary Public.

(Seal)

FILE COPY

APR 6 1931

IN THE

Supreme Court of the United States

OCTOBER TERM, 1930.

IN EQUITY

No. 2 Original.

10

THE STATE OF WYOMING,
Complainant,

vs.

THE STATE OF COLORADO,
Defendant.

BRIEF ON MOTION TO DISMISS.

C. D. TODD,
Greeley, Colorado;
WILLIAM R. KELLY,
Greeley, Colorado;
PAUL W. LEE,
Denver, Colorado;
GEORGE H. SHAW,
Denver, Colorado;
DONALD C. McCREERY,
Denver, Colorado;
WILLIAM A. BRYANS, III,
Fort Collins, Colorado;
LAWRENCE R. TEMPLE,
Fort Collins, Colorado;
Of Counsel.

CLARENCE L. IRELAND,
Attorney General of the State of Colorado,
CHARLES ROACH,
Deputy Attorney General,
FRED A. HARRISON,
Assistant Attorney General of the State of Colorado,
Attorneys for Defendant.

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IN THE

Supreme Court of the United States

OCTOBER TERM, 1930

IN EQUITY

No. 20, Original

HE STATE OF WYOMING,
Complainant,
vs.
HE STATE OF COLORADO,
Defendant.

Brief on Motion to Dismiss.

INTRODUCTION.

(Wyoming vs. Colorado, 259 U. S. 419, 260 U. S. 1)

The present suit is intimately connected with the above decision, is supplemental thereto and seeks enforcement of the decree rendered by this Court.

By reason of the nature of the present complaint it will be necessary for the Court to take cognizance of the pleadings, evidence, arguments and decree in the former proceeding.

It is our contention that the suit mentioned was concerned solely with the prayer of the State of Wyoming for an injunction prohibiting the diversion of any of the waters of the

15,500 acre-feet. This allegation is on information and belief, and it is stated that, according to an official record, this diversion amounted to 13,572 acre-feet and that there were additional "unreported diversions" in the amount of over 3,000 acre-feet; however, that the records of the Division Engineer certified to by him show a diversion of 5,644 acre-feet instead of 13,572 acre-feet of water.

This Ninth paragraph contains the only allegations in the complaint which undertake to charge a violation of the specific terms of the former decree. It will be noted that the averments are ambiguous and uncertain in character and by the Nineteenth paragraph of the complaint it is made to appear that the officials of the State of Colorado charged with supervision over the diversion and distribution of water have denied that any unlawful or excessive diversions of water were in fact made.

We consider that this Ninth paragraph does not measure up to the requirement of a clear and convincing charge of violation of the former decree.

Under Section 1838, Compiled Laws of Colorado, 1921, the Water Commissioner is required to make reports to the Superintendent of Irrigation of his division (now called "Division Engineer").

The immediate control over the Water Commissioner is vested in the Division Engineer, and the record of a Division Engineer as certified to by him, should be regarded as being prima facie correct.

The inference of this paragraph is, that the complainant has no independent belief in the premises, but is making the charge on the sole basis of finding a so-called "official record" in the office of the State Engineer, which is based on the record of the Water Commission of the district. The district is not stated.

The duty is cast upon the Water Commissioner of the district in which the water is used, to keep a record of the amount of water turned into his district from any other district (Sec.

1704 C. L. 1921). The district in which the water is diverted is No. 48 and the district in which it is used is No. 3. In event of discrepancy, it would appear to be the duty of the Division Engineer to investigate and arrive at a conclusion as to the true fact.

Aside from this consideration, the record in the office of the State Engineer, according to the allegation made, shows a diversion of 13,572 acre-feet, which is well within the permitted amount.

While there is a reference to additional "unreported diversions", the pleader fails to state who made these diversions, and fails to allege the facts upon which it is justified in asserting that these "unreported diversions" were in fact made.

The "Skyline Ditch", the property of the Water Supply & Storage Company, carries its water supplies by means of an open ditch around the mountain, and the tunnel appropriator diverts its supplies through the mountain.

For aught that appears from the charge, if the "unreported diversions" were in fact made, this may have been done under arrangements between the two owners, whereby the Water Supply & Storage Company was permitted by the Tunnel owner temporarily to use that conduit.

Compainant bases "belief" solely on the records, but alleges nothing to show that it was entitled to believe the record of 13,572 acre-feet rather than the record of 5,644 acre-feet, nor is it disclosed whether the "unreported diversions" were made under claim of right or otherwise.

The Tenth paragraph states that by the decree the plaintiff was found to be entitled to an amount of water from the river far in excess of the amount to which the State of Colorado was entitled; therefore, having a vital interest in the appropriation, diversion and measurement of the waters of the Laramie River and its tributaries in Colorado, should be permitted to install its own standard gauging devices and make its own measurements in Colorado, yet that the defendant,

though requested in writing by the complainant for such permission, denied such request.

This paragraph is to be read in connection with the Eighth paragraph, which charges, upon information and belief, that the gauges installed by defendant do not accurately measure the full amount of water diverted.

It is not, however, indicated in what manner the plaintiff has reached the conclusion that these gauges are inaccurate.

Under Section 1703, C. L. (Colo.) 1921, an appropriator transferring water from one public stream to another is required to construct and maintain, under the direction of the State Engineer, flumes or weirs and self-registering devices at the point where the water leaves its natural watershed and is turned into another and also at the point where it is finally diverted for use from the public stream. These automatic devices exist—at least their existence is not denied by the bill. Having regard to the presumption of regularity and honesty, which attends official acts, it would appear that the plaintiff, in attacking the correctness of the gauges, should set forth the facts why they are under suspicion. It is not claimed that there has been any refusal on the part of defendant to permit access to these self-registering devices or to make any investigations required to reach a determination regarding their correctness.

The Tenth paragraph is to be read in connection with the Second Count, and it contains merely the flat assertion that, by reason of the extent of complainant's interest, it ought to be permitted to install its own gauges. This was not thought to be necessary in 1922 at the time of drafting of the former decree, and, if anything has since transpired indicating that Wyoming has been prejudiced by reason of its not possessing check gauges, these facts should be alleged.

Paragraphs Eleven to Fifteen, inclusive, deal with certain alleged excessive or unlawful diversions.

Paragraph Twelve refers to "the 18,000 acre-feet of water being the amount *authorized* • • • to be diverted under

said decree * * * by said Skyline Ditch" (the property of the Water Supply and Storage Company), and it is then said that, in 1927, 4,150 acre-feet were taken in excess of the annual amount of water *authorized by said decree thus to be diverted*— in 1928, 1,397 acre-feet and, in 1929, 6,363 acre-feet.

By the Thirteenth paragraph a similar complaint is made as to the so-called "meadow" appropriators.

By the Fourteenth paragraph the defendant is charged as having permitted "unlawful and/or excessive trans-mountain diversions of water to be made from the Laramie River and its tributaries in Colorado through the Bob Creek Ditch; Lost Lake Reservoir System; Columbine Ditch, the Deadman Ditch Feeder or Wilson Supply Ditch; the Divide Ditch, and the Deadman Extension Ditch; to the watershed of the Cache la Poudre River for the irrigation of lands in Colorado, *contrary to and in violation and disregard* of the terms of said decree * * *."

It is then shown that there were diversions by the Bob Creek Ditch in the year 1922 of 512 acre-feet, and in subsequent years varying volumes of water ranging from zero in the years 1924 and 1926 to 1,174 acre-feet in 1923 and concluding with the year 1929, 1,153 acre-feet.

Similar charges are made as to the Columbine Ditch which is said to have diverted 181 acre-feet in the year 1922 with varying quantities in the succeeding years, except that in the years 1924 and 1926 there was no diversion.

Next it is said that Lost Lake, Laramie Lake and Lily Lake, being a part of the Lost Lake System, are used for storing water, their capacity being 806 acre-feet of water; that by means of these reservoirs waters are unlawfully diverted from the Laramie River into the Cache la Poudre River—the only record of the water diverted by the officials of Colorado showing that, in the year 1926, 448 acre-feet were thus unlawfully diverted.

It is next stated that the Deadman Extension Ditch, being

an extension of the Wilson Supply Ditch, has been in part enlarged "from a three foot bottom to a six foot bottom," but it is not alleged that this enlargement will divert a greater quantity of water than the original ditch.

Subsection 8 of paragraph Fourteen states: "That part of the ditch carrying water last year has not been enlarged this year."

We comment that the portion of the ditch referred to as the Deadman Extension Ditch is merely the central part of the Deadman feeder of the Wilson Supply Ditch. This is approximately 5½ miles long as indicated on the map attached to the complaint, and the part said to have been enlarged is a segment of this. In view of the nature of the allegations here, we feel justified in saying that this so-called enlargement is merely a different formation of the cross-section of a small portion of the ditch, and the carrying capacity was not thereby increased, nor is it intended to be increased.

The Fifteenth paragraph undertakes to state the substance of the provisos of the former decree as modified.

The Sixteenth and Seventeenth paragraphs disclose the fact that the Water Supply and Storage Company, as owner of Laramie Lake, Lost Lake and Lily Lake, has made its application to the District Court of Larimer County, Colorado, for authority, under the laws of the state, to divert and store water for irrigation purposes in said reservoirs—the claim being made for 14,817,744 cubic feet of water for the Laramie reservoir; 12,541,030 cubic feet of water for Lost Lake; and 7,747,189 cubic feet of water for Lily Lake.

Paragraph Sixteenth says nothing as to the dates claimed by this owner as to the vesting of its appropriation in connection with these reservoirs.

There was a reference in the former record to the Lost Lake System. (See the testimony of A. A. Edwards at marginal page 2214 of the transcript, concerning Lost Lake; the testimony of L. G. Carpenter at page 2278, referring to the efforts made as early as 1879, 1880 and 1881 to

bring water from Lost Lake into the tributaries of the Poudre; that of J. L. Armstrong at page 2494, referring to his recollection as to the time when Laramie Lake and Lost Lake reservoirs were constructed.)

The Seventeenth paragraph contains similar allegations directed against the Mountain and Plains Irrigation Company, as owner of the Bob Creek Ditch, showing that this owner has applied for an adjudication of its priority to waters to be diverted from the Laramie River Basin by means of the Bob Creek Ditch. The priority date claimed by this appropriator is not stated. Under the allegations of these paragraphs, plaintiff asks in its prayer that these adjudications should be enjoined. They contain no suggestion that this course is necessary for the protection of the rights asserted. The state adjudications, if made, could not bind the Wyoming appropriators nor the complainant, and it would appear extraordinary in a suit between these states, for this Court to enjoin ordinary judicial proceedings carried on in a court of competent jurisdiction by citizens of defendant state. We apprehend that to permit such action a case of over-riding necessity should be made out, which is not here disclosed.

The Eighteenth paragraph refers to a topographical map of the watershed of the Laramie, showing location of the several diversions described.

Paragraph Nineteenth charges that the water officials of Wyoming have conferred with like officials of Colorado protesting "against such excessive or otherwise unlawful diversions of water from the Laramie River and its tributaries in Colorado, for the irrigation of lands in Colorado, contrary to and in violation and disregard of said decree of this Honorable Court; but such officials of Colorado have denied that any such excessive or otherwise unlawful diversions existed."

Therefore complainant is without relief "from such excessive and otherwise unlawful diversions of water, except

through and by the order, judgment and decree of this Honorable Court."

Paragraph Twentieth states that defendant, unless restrained will, through its officials, agents, representatives, servants, or other citizens or residents, or its corporations, continue to increase the diversion of water from the Laramie River and its tributaries for the irrigation of lands in Colorado; and unless restrained "will continue until the amount of water determined by the decree of this Honorable Court as being available to Wyoming for the water users in Wyoming, to-wit, 272,500 acre-feet, will be gradually reduced and finally consumed, and Wyoming and its citizens, residents and corporations will be deprived of any protection under the said decree * * * and that annually since the entry of said decree, the amount of water available to the State of Wyoming for its water users has been less than the said 272,500 acre-feet of water per annum, caused by reason of said excessive and otherwise unlawful diversions."

The foregoing paragraph Twentieth contains the only allegations tending to show injury or damage, and is largely prophetic in character.

The Twenty-first paragraph states that this Court has the exclusive jurisdiction to adjudicate upon the matters which were determined in the former suit, and that thereupon "Colorado, and through it, its officials, agents, representatives, servants, and other citizens and residents, and its corporations should be required by this Honorable Court to abide by the terms of said decree, and be prevented by this Honorable Court from any violation of the terms thereof."

The Twenty-second paragraph states that the complainant has no adequate remedy at law.

SECOND COUNT.

By the SECOND COUNT all the allegations of paragraphs numbered First to Twenty-first are adopted by reference, and it is thereupon alleged that, on March 8, 1928, the

plaintiff made request in writing for permission to install measuring devices "in order to make an inventory of such waters in Colorado, jointly with Colorado and with the United States Geological Survey," but that said request was denied.

The claim is made that, by reason of the premises, the complainant should be permitted to install gauging devices in the State of Colorado in the Laramie River and its tributaries and *in any trans-mountain ditches, lakes and reservoirs* by means of which water is being or may be diverted from said Laramie River and its tributaries in the State of Colorado to the Poudre River basin.

The allegations of this count are to be read in connection with the Eighth and Tenth paragraphs of the First Count; and it is then disclosed that Wyoming takes the position that, without any allegations showing prejudice to her rights, without any facts being alleged showing that the automatic gauges now in use understate the amounts diverted, without any investigation disclosed as having been made upon which to found a charge of error in the gauges installed, Wyoming is entitled, because of her interest in this stream alone, to install and maintain her own independent meters. No suggestion is made as to solution of disagreements between agents in charge of the respective measuring devices of the two states. An alternative course is, however, suggested that the installation of gauges and measuring of waters should be carried on by the Federal Government.

By the prayer the Court is asked to assume sole jurisdiction; that defendant present its answer and abide by the determination of the Court; that the rights of the State of Wyoming be quieted under the adjudication in said case of Wyoming vs. Colorado, et al.; that Wyoming be permitted to install standard gauging devices, etc.; and "that in event the said court shall find in and by said decree that the injunction entered therein applied only to the diversion by the State of Colorado of the waters through the Laramie-Poudre Tunnel, that this Honorable Court may, temporarily, during the pen-

dency of this cause, and permanently, on the final determination hereof, enjoin the said State of Colorado, and through it or otherwise, as the court may determine, its officers, agents, representatives or servants, or other persons or citizens and its corporations, from diverting any water from said Laramie River and its tributaries in Colorado, for the irrigation of lands in Colorado, in excess of the available quantities of water allotted to Colorado in and by said decree; or from further adjudication thereon in the Courts of Colorado" and for general relief.

MOTION TO DISMISS.

From the above summary it is apparent that the relief sought in this action is primarily against the owners of the Skyline Ditch, the Meadow appropriators and the Wilson Supply Ditch, all of whom were mentioned in the testimony and decision in the original proceeding, but none of whom were parties, and against the owners of the Bob Creek Ditch, the Columbine Ditch and the so-called Lost Lake System, none of whom were mentioned or made parties in the former action.

In this respect it is different from the former suit in which the two Colorado corporations which were seeking to perfect the diversion and appropriation of the water of the Laramie River were joined as defendants and were directly enjoined "from diverting or taking more than 15,500 acre-feet per year from the Laramie River by means of or through the so-called Laramie-Poudre project."

Briefly stated, the motion shows that the facts alleged do not disclose a "controversy" within the meaning of the Constitution; it points out the indefiniteness in allegation as to violation of the former decree; the failure of the bill to show damage; that claims made as to the necessity for gauging devices refer not to the Laramie-Poudre tunnel but to other appropriations, the rights of which were not and could not have been adjudicated in the former suit; that the present complaint, regarded as supplemental to the former decree, seeks without

justification to enlarge the effect thereof to the end of limiting the appropriations which were not in controversy in the former action; that regarded as a bill for construction of the former decree, it claims an interpretation which would make the decree conclusive on the rights of all appropriators in Colorado without regard to the actual relative priorities of these appropriators and those of Wyoming, and the decree is not and could not under "due process" be susceptible to such construction; that the bill is multifarious—being

(1) one for enforcement of the former decree; (2) for the general adjudication of all Wyoming as against all Colorado appropriations of the waters of the Laramie River; (3) for relief as to certain claimed excessive diversions through the Laramie-Poudre tunnel in 1926; (4) for ancillary relief as to the installation of gauging devices for the measurement of water diverted by trans-mountain ditches and reservoirs; that the bill discloses that acts charged to have been committed, viz., excessive or claimed "unlawful" diversions were made by persons other than the owners of the Laramie-Poudre tunnel appropriation, and as to such persons any decree to be rendered in the present suit would be inefficacious, since their rights were not drawn in question in the former suit, and any action now to be taken to make these rights subject to the decree of 1922 on the basis of the record in said suit would be without due process and in conflict with the Fifth Amendment to the Constitution of the United States.

This motion is directed to both counts of the complaint.

The rights asserted under the second count grow out of the facts alleged in the first count; and in the discussion of the Motion to Dismiss it is not considered to be necessary separately to treat these different causes of action.

ARGUMENT.

The complaint presents the defendant as having violated and disregarded the decree of this Court rendered in the former suit. Some of its allegations are those of a bill for enforcement of the former decree—some seek a construction of the former decree to the end that it be now determined that diversions made other than that made from the Laramie River by means of the Laramie-Poudre are subject to the force and effect of such former decree so that, for illustration, the so-called "Skyline" ditch diversion is limited perforce of said decree to a maximum of 18,000 acre-feet per annum in like manner as if the owner of said ditch and water right had been a party to the former suit and had been specifically thereby enjoined from diverting any water in excess of the permitted amount.

The complainant, however, is not willing, on this aspect of its case, to ground its claim solely upon the basis that the former decree was effective to define and limit all other diversions in Colorado taking water from the Laramie, in addition to enjoining the diversion by means of the tunnel, for by its prayer it asks for additional relief in the event the Court "shall find in and by said decree that the injunction entered therein applied only to the diversion by the State of Colorado of the waters through the Laramie-Poudre tunnel."

In this event a temporary injunction is sought to restrain diversions of "any water from said Laramie River and its tributaries in Colorado for the irrigation of lands in Colorado in excess of the available quantities of water *allotted to Colorado in and by said decree.*"

The idea expressed by the bill under this aspect is that, by the decree as modified (260 U. S. 1), which was expressly made without prejudice to the right of the State of Colorado to continue to exercise rights of diversion thereby recognized to take certain quantities of water by means of stated diversions and appropriations, thereby such appropriations and diversions were effectively limited to the conceded and recognized amounts. If, however, the Court should disagree with this

contention and hold that the decree as modified did not produce that result, and the matter was not thereby finally adjudicated to the end of limiting the rights of all "others", then that the Court, with respect to the temporary status, should consider, for the purpose of the showing on the application for the temporary injunction, that the quantities of water referred to in the modified decree should be deemed, until the time of final adjudication, to be the amounts "allotted" to Colorado. Under this concept the "allocation" should continue to govern until such a time as by proof presented by defendant it should be made to appear that the owners of such "other" appropriations of the Laramie waters had been unduly circumscribed in the enjoyment of their vested rights. The burden thus is sought to be imposed upon Colorado to justify any diversions in excess of the amounts which were conceded by Wyoming in the former proceeding, and under the concession, recognized by this Court in the decree as modified. Although the prayer of the complaint thus suggests alternative courses for this Court to follow, and the complainant is presented as unwilling to abide the result of the determination of the single issue whether the decrees in question effectively limit and enjoin appropriators other than the tunnel appropriators, and desires, in event that issue shall be determined adversely to its contention, to prosecute further to the end of obtaining a determination that these others must not exceed the conceded and recognized amounts, yet no facts are alleged to show that appropriators in Wyoming are justly entitled to this result. There are no allegations in the bill touching the dates of the several appropriations perfected in the State of Wyoming which are supposed to be prior in right to the appropriators in Colorado other than the tunnel appropriator, and the prayer in this connection is simply that, upon the final hearing, these other appropriators shall be limited to the amounts designated in the decree as modified.

The real attitude here is that although it may be that "others" are not now technically bound to abide the decree, yet that they may be effectually drawn into the controversy now,

and upon the existing record, by amendment of the former decree, should be enjoined.

As we understand the position here taken, it is that, due to some oversight in drafting the former decree, it was not made in terms to include an injunction against the several appropriators in Colorado who were owners of the "recognized" water rights, nor was the injunction entered against the state adequate to affect these rights possessed by citizens who are not parties to the former suit. This situation the State of Wyoming considers can now be corrected, and it is faintly suggested in the prayer that this should be done by bringing in other parties, in which action is demanded that this Court "enjoin the State of Colorado, and through it, *or otherwise* as the Court may determine * * * from diverting any water * * * in excess of the available quantities of water *allotted* to Colorado in and by said decree." (Page 27, Complaint.)

So in this view the bill does not seek, upon a disclosure of the facts showing priority of right possessed by the whole body of Wyoming appropriators, or by any one or several of them against the other "Colorado appropriators," to obtain a general adjudication of water rights in this interstate stream, but instead presents the matter to the Court as if the rights possessed by Wyoming may be ascertained and discovered by the Court upon inspection of the whole record in the former suit, and thereupon that the Court should so amend and expand its decree as to bring within its force and effect not only the tunnel diversion which was complained of in the former suit, but, as well, every appropriator in Colorado from the Laramie, regardless of the effective vesting of his title and the relative rights of the several appropriators in the State of Wyoming.

So the bill appears to be one for enforcement of the rights clearly given the State of Wyoming by the former determination, in respect of the injunction against any diversion in excess of 15,500 acre-feet by the tunnel; also to have the Court declare that this former determination was effective not alone

for what the decree said, but also as an adjudication of all interstate controversies respecting the water of the Laramie River: alternatively, if the decree is not susceptible on its face to the construction claimed, then there is sufficient in the record from which that result may be now determined; and that, under the present "original" bill, the Court can properly render a decree to have the effect of modifying and enlarging the scope of the former decree.

The complaint has various and inconsistent aspects: First, as for enforcement of the decree as written; second, as a bill to construe the decree to the end of obtaining a declaration that everything now complained of by Wyoming was fully litigated and determined in the former action; if this determination cannot be reached as a matter of construction of the decree merely, then, as a bill to amend the former decree by enlarging and extending its scope and effect, and if necessary to that end, to bring in additional parties to abide the foreordained result.

There is not a single allegation in the complaint to the effect that any Wyoming appropriator is entitled to prevail because of priority possessed in fact over the Colorado appropriators whose rights are now attacked. All charges are made with reference to the 272,500 acre-feet claimed to have been awarded to Wyoming as a finality, and disregarding the obvious fact that the determination of that amount was confined to the issue presented of the rights of Wyoming appropriators relative to the effective date of vesting of the tunnel appropriation. These rights are prior to that date—October, 1909—but they are not prior to the rights possessed by the Water Supply & Storage Company in connection with its Skyline Ditch, which the record in the former suit discloses was built in 1891, nor are they as a class prior to any other Colorado water right vested prior to 1909, nor is there in the former proceeding any proof from which these relative rights can now be ascertained even if the ambit of the former suit were considered to be sufficient to permit of a general adjudication

of all rights of appropriators from the Laramie River in both Colorado and Wyoming.

A cursory reading of the complaint in the first suit will convince that the plaintiff there had no purpose to draw in question anything other than the then threatened diversion through the tunnel and was perfectly satisfied with the *status quo ante.* Nor is any such purpose now to be discerned in the present bill, save upon the assumption that all Colorado rights other than those of the tunnel, were defined and limited by the decree, and that rights then existing and vested, but not mentioned in the decree, were destroyed because of its silence.

Non constat that if Wyoming is held to be in error in this assumption, it will desire to maintain this suit or file a new bill in equity for such a general adjudication. Its right to act in such supposed suit, as representative of the purely private and individual rights of citizens would be open to grave question, but that is a problem which it is not necessary now to attempt to solve.

Nowhere in the complaint is to be found a specific allegation of injury to the State of Wyoming.

For aught that appears in the complaint every appropriator in Wyoming since the year 1922, when the former decree was rendered, may have obtained ample water supplies to the full extent of his beneficial use. There is a studied effort to abstain from any disclosure of claimed damage.

The only allegations dealing with the effect of the alleged "trespasses" of Colorado are to be found in the twentieth paragraph, in which it is said that the State of Colorado, unless restrained, will continue to increase the diversion of water from the Laramie River * * * and unless restrained will continue until the amount of water determined by the decree of this Honorable Court as being available to Wyoming for the water users in Wyoming, to-wit, 272,500 acre-feet, will be gradually reduced and finally consumed. * * *

This is prophecy merely, and no facts are stated to show the "increase" referred to; it is not alleged that any of the

so-called "unlawful" or "excessive" diversions had their inception on dates subsequent to the commencement of the former suit; nor is it said that the methods of use practiced have been changed in any respect from the methods in vogue before the former suit was instituted.

The diversions by the Bob Creek Ditch and by the Columbine Ditch are characterized as unlawful, but it appears from the allegations of the fourteenth paragraph that these diversions were continuously made since the year 1922 and so rights were asserted in connection therewith at the time of entry of the former decree. There is nothing in the complaint which charges that these diversions are junior in right to any of the Wyoming appropriations, and they are so "unlawful" merely under the claim that any diversion not recognized and permitted by the former decree is such. Similarly with respect to Lost Lake, Laramie Lake and Lily Lake—these lakes had long been in use prior to the taking of evidence in Wyoming vs. Colorado, and it is now claimed that their diversions are rendered unlawful by force of the former adjudication. There is a reference in the thirteenth paragraph of the complaint to an apparent increase in acreage irrigated by means of the so-called "meadow" diversions, but it is not therein stated that this increased the consumptive draft on the stream to the prejudice of complainant, nor that the acreage represents an actual increase over the acreage irrigated prior to the rendition of the former decree. The whole complaint in this connection is with regard to the limitation claimed to have been imposed with respect to these "meadow" appropriations by force of the former decree.

In paragraph fourteen, sub (5), (6), (7) and (8), there is reference to a projected enlargement of the Deadman extension ditch. It is disclosed, however, that this has not been completed, and it is not alleged that, upon the completion of this extension, any more water will be diverted from the stream than has customarily in the past been diverted.

The allegations of the complaint are very weak as to facts

showing the present necessity of the Court's taking cognizance to the end of enforcing the right admittedly possessed by complainant, to limit the tunnel diversion to 15,500 acre-feet. These allegations do not constitute the gravamen of the cause of action. They seem to be incorporated in order to afford a definite basis for the prayer that this Court assume exclusive jurisdiction.

This is to the end of affording an excuse to invite the Court's attention to the problem of construction and extension of the decree which the complainant desires to present.

The plaintiff asserts that the decree already rendered means that the Skyline diversion is now effectively limited to but 18,000 acre-feet per annum, or that it should be so limited upon a reconsideration of the former decree, and similarly with respect to all other of the diversions referred to in the decision. As to diversions not referred to, it is claimed that they are made illegal and subject to be enjoined by reason of the former decree alone.

If this Court should conclude that this is the correct view of the force and effect of its decree, that conclusion would practically dispose of the case, because, it will not be denied by Colorado that at times the Skyline Ditch, for example, has diverted more than 18,000 acre-feet per annum under claim of right, this ditch having been constructed in the year 1891, many years prior to the application of water to the larger portion of the 181,500 acres of land in Wyoming referred to by this Court in its opinion as having rights to 272,500 acre-feet of water prior in time and right to October, 1909. As to the Second Count of the complaint it is not to be assumed that Colorado will decline to permit access to and opportunity to check operation of measuring devices in event it shall be determined by this Court that all other appropriators are bound to abide the decree under the construction claimed by plaintiff, or as amended by the Court expressly to bind them. If orders are considered necessary to cover installation and operations of check gauges by Wyoming they would be incidental to the main relief. So

the "Second Count" is not an independent cause of action but presents merely an aspect of the remedy sought. It stands or falls with the determination of the principal issue.

If Wyoming is not right in the contentions which are now made, we think there is little, if any, difficulty with respect to measurements of the flow through the tunnel, or with respect to any actual excess diversion by means thereof.

The allegation as to such supposed excess diversion is found in the ninth paragraph of the bill. This is on information and belief—it refers only to the year 1926, and the record in the office of the State Engineer showing a diversion of 13,572 acre-feet and some "unreported" diversions in the amount of 3,000 acre-feet. Nevertheless, the records of the Division Engineer, as certified to by him, show a diversion of but 5,644 acre-feet in that year.

The allegations concerning the need of Wyoming to have accurate measurements of the waters of the Laramie River and the diversion thereof refer to the entire stream and to all of the appropriations. It is not charged that there is any inadequacy or error in the gauging devices and measurements of water carried through the Laramie-Poudre tunnel.

If the major contentions of Wyoming were out of the way, we feel very sure that the officials of the two states could readily reach an accord as to the measurements of stream flow and diversions through and by means of the tunnel, and by other appropriators.

If consideration of this bill were confined alone to the allegations concerning excessive diversions through the tunnel, it would appear sufficiently evident that the grievances asserted are not of sufficient moment to enlist the attention of the Court.

The principal purpose of the motion to dismiss is to join issue with the contention of the complainant that the whole matter has already been finally adjudicated by the former decree. The problem so presented is a law question and it is apprehended that this should be determined *in limine.*

If upon the motion it is determined by the Court that the major contention of the plaintiff is untenable, the question thereupon for determination would be whether or not, under the allegations of the complaint, a sufficient foundation in fact had been laid to require the court to undertake a general adjudication of all water rights in Colorado and their priorities as respects the water rights and priorities of appropriators in Wyoming. We say that this would not be required because not in accord with the theory under which the plaintiff presents its case, which is that in any event the determination must be reached either with regard to the decree alone or with regard to the decree sought to be amended in the light of the whole record so as to enjoin all diversions in excess of the "recognized" appropriations.

The major contentions of Wyoming present law issues only, and until those issues are disposed of and the determination is reached as to possible fact issues involved, it would be futile for defendant to tender its answer raising the issues of fact upon which it will predicate its claim that the appropriations under attack are prior in right to the great majority of the several appropriations in Wyoming which were recognized to the extent of 272,500 acre-feet as prior to the Laramie-Poudre tunnel appropriations of date 1909.

If it should be contended that the Motion to Dismiss goes to the whole bill and should not be entertained because the complaint tenders a sufficient issue regarding the necessity of specific enforcement of the decree, our answer would be that the complaint as a whole is founded upon a fallacious theory as to the effect of the decree, and but for this fallacy it is not apparent that Wyoming would desire to prosecute the suit to be founded alone upon the charges as to the supposed excess diversion in 1926 through the tunnel and the necessity for installing gauging devices, especially since as to the latter there is not disclosed any inaccuracy in the measurement of water carried through the tunnel, nor any difficulty confronting the plaintiff in access to the existing

measuring devices installed in connection with all transm. intain diversions.

But if the bill is to be limited to the allegations germane to a suit for enforcement merely, it would not present a controversy of the "serious magnitude" referred to in the decisions of this Court, as a prerequisite to assumption of jurisdiction. (State of Connecticut vs. Commonwealth of Massachusetts. Decision rendered Feb. 24, 1931.)

The bill is not susceptible to the construction that complainant is seeking a decree fixing the *status quo* which prevailed at the time of the rendition of the former decree, to the end that no new appropriations shall be permitted, and that any "new" rights claimed shall be declared to be invalid, and that diversions in excess of those customarily practiced prior to the institution of the former suit should be enjoined.

If it had been the purpose of the pleader to assert that the Bob Creek and Columbine Ditches were new enterprises possessing no rights prior to 1911 (the date of institution of the former suit) or prior to 1909 (the date of the Laramie-Poudre appropriation), and that the Lost Lake System was non-existent at that time, it would have been an easy matter to make this categorical charge.

But instead these diversions are characterized as "illegal", without more. And so with regard to the "excessive" diversions claimed, they are "excessive" only because in excess of the amounts which the pleader considers to have been "allotted" and, therefore, conclusively in violation of the decree.

Thus, virtually the entire case for plaintiff is made upon the theory that the provisos of the modified decree (260 U. S. 1) produce the result that the Water Supply & Storage Company, for example, in its enjoyment of its Skyline Ditch appropriation is as effectually limited to 18,000 acre-feet per annum as is the owner of the Laramie-Poudre tunnel appropriation to 15,500 acre-feet. This result is thought to be attained, although the owner of the Skyline appropriation was not made

a party, nor did the plaintiff in the former suit attack that appropriation but, on the contrary, expressly recognized it, and in argument contended that the amount which reasonably might be anticipated to be diverted would be substantially in excess of the average of 18,000 acre-feet per annum. (See the discussion at page 6, et seq. of "Supplemental Brief on Behalf of Plaintiff" in the former suit.)

This supplemental brief conclusively shows that it was not claimed that the diversions of either the Skyline Ditch or the Divide Ditch could be limited to any precise volume.

At page 10 of that brief, it is said in behalf of Wyoming:

> "Our conclusion with respect to the amount of water that Colorado will divert from the Laramie River into the watershed of the Poudre, is:
>
> 1. That under conditions existing prior to 1913, the amount would in average years exceed 91,000 acre-feet, as contended by Colorado, by at least 4,000 acre-feet, the estimate for both the Skyline and the Divide ditches being 2,000 acre-feet too low, as shown by their records set forth in defendant's Exhibit No. 124."

At page 49 of the brief filed in behalf of Wyoming on the demurrer to the original bill, it is clearly made to appear that the complaint was directed solely against the contemplated tunnel diversion.

Throughout the briefs in the discussion of the subject, there is reference to the "average amount" which might normally be expected to be taken by the Skyline and Divide ditches in Colorado.

No divestiture of right was contemplated as possible by either party.

At page 8 of the Supplemental Brief in Behalf of Wyoming a table is presented showing a diversion by means of the Divide Ditch as high as 6,810 acre-feet in the year 1904.

Contrast this with the "average" which is referred to as

2,000 acre-feet. Similarly in the table it is shown that in the year 1903 the Skyline Ditch discharge included 26,114 acre-feet.

At page 27 of the original brief for Wyoming, there is reference to the evidence of the State Engineer of Colorado, who testified that the anticipated diversion through the tunnel would be 56,000 acre-feet, and that, if an extension of the West Side Collection Ditch were made to McIntyre Creek, as contemplated, an additional amount of 15,000 acre-feet could be procured, making a total possible diversion of 71,000 acre-feet per annum through this system. To this he added 18,000 acre-feet as the *average annual diversion* from the Laramie River into the Poudre through the Skyline Canal, and 2,000 acre-feet as the *average annual diversion* from several of the east side tributaries of the Laramie into the Poudre through an earlier ditch known as the Divide or Wilson Supply Ditch, which carries water around the northern end of the mountains constituting the eastern boundary of the Laramie River drainage area. This makes the total actual and contemplated diversion from the Laramie into the Poudre 91,000 acre-feet. * * * "*These facts constituted the foundation of the plaintiff's case.* * * * that the defendants, having already diverted 20,000 acre-feet per annum from the river for use in another watershed, are now attempting to divert an additional amount of from 56,000 to 71,000 acre-feet * * *."

If this inquiry should be exhaustively pursued, it would be found that throughout there is not a suggestion from either party to the record that the defendant should be limited in respect of any of these "other" appropriations but, instead, their diversions are treated as physical facts affecting the result, as to what might be reasonably anticipated through the years for the future, as to the volume of water normally to be expected as available at the state line to supply the Wyoming rights.

If these "other" rights were before the Court for adjudication and limitation, it is sufficiently obvious that they could

not be limited to an amount which admittedly was the result of averaging all of the diversions through a term of years.

By the table referred to above (page 3398 of the transcript in the former suit), it appears that the diversions of the Skyline ranged from as low as 12,725 acre-feet in the year 1909 to as high as 26,114 acre-feet in the year 1903, and that in the year 1912, 20,986 acre-feet were taken. It is evident that if the corporation owner of this appropriation is now to be limited to a maximum of 18,000 second feet, it will be deprived of a portion of the right upon which the "average" was computed.

It is impossible to place this appropriation in the same category as that of the tunnel. In the decision of this Court in the former action, it is recognized that the tunnel appropriation will receive its full measure of water allocated to it in all years, and that "the Wyoming appropriations will receive the water only after it passes down into that state, and must bear whatever risk is incident to the variation of the natural flow." The result in this connection is very different from that obtained in a general adjudication of water rights, where the control of the stream is vested in a water commissioner.

The Court there reached a practical solution whereby the tunnel appropriator had to sacrifice the normal right to take up to the limit of its projected development after all prior rights should be satisfied, and yet it obtained what the Court regarded as equivalent, namely, in effect a preference right to a defined extent. But in the case of the Skyline Ditch there would be no opportunity to balance rights. The Water Supply & Storage Company, owner of this ditch, is unquestionably senior to all except a very few Wyoming appropriations.

The language of the proviso:

> "That this decree shall not prejudice the right of the State of Colorado, or of anyone recognized by her as duly entitled thereto, to continue to exercise the

> right now existing and hereby recognized to take and divert from such stream 18,000 acre-feet of water per annum, in virtue of and through what is designated * * * as the Skyline Ditch appropriation * * *"

does not and cannot mean that there is prejudice with respect to taking any more than 18,000 acre-feet.

The language "this decree shall not prejudice" is affirmative and final to the extent of the recognition found. Wyoming, in hereafter asserting the rights of citizens and appropriators, should be estopped to claim that this right should be limited below 18,000 acre-feet per annum, but the owner of that appropriation cannot be estopped on the basis of any supposed "average" to claim that its appropriation was vested to the extent, for example, of a total user of 26,000 acre-feet per annum.

Appropriations in both States are measured in terms of flow, and no limitation is imported as to the time when they may be utilized, so long as the water is applied to beneficial use.

If the decree in the former suit was intended, under the proviso, to mean anything other than a full recognition of the Colorado vested rights, which were not attacked in that proceeding, the decree would to that extent be void.

But we confidently assert that there was no such intent.

The position taken by Wyoming was that it dealt with the status of existing Colorado priorities as an accomplished fact —that diversions already made are made under vested right,— and the situation is no different than it would be if the Skyline and Divide ditches were natural streams. In attempting to arrive at a just result as to whether or not the tunnel diversion should be entirely enjoined or limited, it was necessary for the Wyoming appropriators as a class to recognize the existing physical status and the extent of the "average" depletions of the river caused by these Colorado diversions. Nowhere in the testimony adduced, nor in the briefs submitted,

did the plaintiff invite a specific determination of dates and amounts of the Colorado ditch diversions on the one hand as against all appropriators in Wyoming on the other.

The Wyoming theory was that it had appropriated to beneficial use the entire available flow of the river so that there was no residue left for the tunnel. This claim made it necessary to examine the extent of Wyoming rights prior to the tunnel project.

It does not follow that because 272,500 acre-feet were adjudged prior in right to the tunnel, the same quantity of water rights is prior to the Skyline appropriation, for example. Wyoming desired not to complicate its case by seeking a specific adjudication as to parties other than the Laramie-Poudre Company and the Greeley-Poudre district, and so, in order to obviate the necessity of bringing in others as necessary parties, that state saw fit to make certain concessions and the extent of the concessions was as indicated in the language of the proviso to the amended decree.

Wyoming in effect said: "Our 272,500 acre-feet is prior to the tunnel right but we concede that we have no action as to 22,250 acre-feet diverted by others."

The decree cannot be construed to include an adjudication of these "other" rights.

> "The decree should respond to all the pleadings and determine all the issues; but nothing is in issue unless it is raised by the pleadings, and hence the decree must conform not only to the evidence but also to the pleadings; it must be *secundum allegata et probata;* the evidence must conform to the allegations and the decree to both." • • • (21 Corpus Juris "Equity" p. 670, sec. 854)

> "If the pleadings in the case were to give no notice to the parties or to the court of the material facts on which the right asserted was to depend, no notice of the points to which the testimony was to be directed, and to which it was to be limited; if a new case might.

be made out in proof, differing from that stated in the pleadings, all will perceive the confusion and uncertainty which would attend legal proceedings, and the injustice which must frequently take place. The rule that the decree must conform to the allegations, as well as to the proofs of the parties, is not only one which justice requires, but one which necessity imposes on courts."

(Crocket v. Lee, 7 Wheat. 522, 5 Law Ed. 513.)

We consider it to be obvious that the decree as written cannot be construed to be effective as a finality in the sense that all Colorado appropriators are limited to the "allocation" claimed to have been made.

Is it then possible for the plaintiff, on the basis of its present allegations, to go forward with its complaint to the end of obtaining a specific adjudication against every Colorado appropriator, using the decree as a vantage point, but without disclosing any of the facts concerning the relative priority rights claimed to be possessed by Wyoming appropriators as against the Colorado appropriators whose rights are now subject to attack?

It is far from clear that the plaintiff desires to take that position. Rather it appears to be true that it desires to stand upon its interpretation of the decree as written, and that, if the Court should hold that the construction claimed is not tenable, the former record should be examined in its entirety to the end of entering an amended and extended decree.

If, however, it should be thought that there is enough in the bill to suggest the desire of Wyoming to present an issue under which evidence would be taken touching the relative rights of each and every of the stream appropriators in both states, it would appear to be an injustice on the defendant to require it affirmatively to set up the rights in its citizens which it claims are prior to the rights possessed by the owners of the 181,500 acres in Wyoming referred to in the former case.

In this view, Wyoming would be asserting a prima facie

However, as to the latter point, if the Court should be of the opinion that there is sufficient remaining in the bill after the determination of the major issue, and thereupon shall rule the defendant to answer, as to all matters connected with the Laramie-Poudre diversions since the entry of the former decree, the issues of fact in that respect will be promptly tendered.

We insist, however, that the disposition of the cause will be greatly accelerated and confusion be avoided by determining at the threshold the issues of law tendered by the complaint, and thereupon the issues of fact should be defined, if any are considered to stand for adjudication after passing upon the construction problem, which is the only substantial controversy in the case.

Respectfully submitted,

CLARENCE L. IRELAND,
Attorney General of the State of Colorado,
CHARLES ROACH,
Deputy Attorney General,
FRED A. HARRISON,
Assistant Attorney General of the State of Colorado,
Attorneys for Defendant State of Colorado.

C. D. TODD,
WILLIAM R. KELLY,
PAUL W. LEE,
GEORGE H. SHAW,
DONALD C. McCREERY,
WILLIAM A. BRYANS, III,
LAWRENCE R. TEMPLE,
Of Counsel.

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In the
Supreme Court of the United States

OCTOBER TERM, 1930

IN EQUITY
No. [redacted] Original 15 10

THE STATE OF WYOMING,
Complainant,

vs.

THE STATE OF COLORADO,
Defendant.

Brief in Opposition to Motion to Dismiss

JAMES A. GREENWOOD,
Attorney General of the State of Wyoming.

RICHARD J. JACKSON,
Deputy Attorney General of the State of Wyoming.

PHILIP S. GARBUTT,
Assistant Attorney General of the State of Wyoming.

GEORGE W. FERGUSON,
Assistant Attorney General of the State of Wyoming.

ATTORNEYS FOR COMPLAINANT,
STATE OF WYOMING.

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In the
Supreme Court of the United States

OCTOBER TERM, 193[illegible]

IN EQUITY

No 20, Original

THE STATE OF WYOMING,
Complainant,

vs.

THE STATE OF COLORADO,
Defendant.

Brief in Opposition to Motion to Dismiss

The State of Wyoming filed her bill of complaint on October 6th, 1930, in this Court. The bill seeks to prevent violations of the decree entered October 9th, 1922, reported in Vol. 259, U. S. Rep., Page 419, and Vol. 260, U. S. Rep., Page 1, by the State of Colorado and parties permitted under the laws of Colorado to appropriate and use, in the State of Colorado, the waters of the Laramie River; and the bill alleges the acts and conduct on behalf of defendant constituting such violations.

Colorado moves to have the bill of complaint dismissed, and her grounds therefore are summarized in the statement found in the last paragraph, Page 1, of defendant's brief in support of the motion to dismiss, wherein defendant states:

> "It is our contention that the suit mentioned was concerned solely with the prayer of the State of Wyoming for an injunction prohibiting the diversion of any of the waters of the Laramie River through and by means of the Laramie-Poudre tunnel."

To bring clearly before the Court the only question involved in the case at Bar, complainant states that it is the contention of the Complainant that in the decree entered in the case of Wyoming vs. Colorado, 259 U. S. Rep., Page 419, 260 U. S. Rep., Page 1, the Court determined the available annual water supply for diversion and use to satisfy the demands of the various appropriators and users of water from the Laramie River and tributaries within the States of Colorado and Wyoming, and determined the relative rights of each of said states in the use of the waters of said Laramie River and tributaries.

That Colorado so understands this to be the purpose of this action, is evident from the statement in her brief at the bottom of Page 21, as follows:

> "The principal purpose of the motion to dismiss is to join issue with the contention of the complainant that the whole matter has already been finally adjudicated by the former decree. The problem so presented is a law question and it is apprehended that this should be determined *in limine.*"

THE RELATIVE RIGHTS OF WYOMING AND COLORADO TO THE USE OF THE WATERS OF THE LARAMIE RIVER

This Honorable Court, after rejecting the respective contentions of Wyoming and Colorado in the case of Wyoming vs. Colorado, supra, proceeded to consider the basis on which the relative rights of these STATES in the waters of this interstate stream should be determined. (See opinion, Vol. 259, U. S. Rep., Page 467.)

As a preliminary step to a determination of the question of the relative rights of these states in the use of the waters of this interstate stream, the Court says (See opinion, Page 271, Vol. 259, U. S. Rep.) that the first and one of the most difficult

questions for solution relates to the flow of the Laramie River, the common source of supply, and at Page 488, 259 U. S.:

> "* * * the entire supply available for the proposed Colorado appropriation and the Wyoming appropriations down to and including the diversion for the Wheatland district is 288,000 acre-feet."

and at Pages 489 and 490:

> "There are some existing Colorado appropriations having priorities entitling them to precedence over many of the Wyoming appropriations. These recognized Colorado appropriations are, 18,000 acre-feet for what is known as the Skyline ditch, and 4,250 acre-feet for the irrigation of that number of acres of native-hay meadows in the Laramie valley in Colorado, * * *."

that these recognized diversions are not to be deducted from the 288,000 acre-feet, that being the available supply after they are satisfied.

At Page 489 of said opinion, the Court says:

> "The available supply—the 288,000 acre-feet—is not sufficient to satisfy the Wyoming appropriations dependent thereon and also the proposed Colorado appropriation, so it becomes necessary to consider their relative priorities."

The Court concluded that under the evidence, Wyoming was entitled to appropriate of the determined available annual supply, the amount of 272,500 acre-feet, found by the Court to be a sufficient amount for the irrigation of 181,500 acres of land in Wyoming, leaving available for diversion through and by means of the Laramie-Poudre Tunnel, 15,500 acre-feet annually. (See Opinion Pages 495 and 496.)

CONSTRUCTION OF THE DECREE BY THE STATE OF COLORADO

Upon rendering of the original decree in the former Wyoming-Colorado case, supra, the State of Colorado petitioned for a re-hearing; and Colorado's construction and under-

standing of the scope of said decree, as set forth in said petition for re-hearing, and the effect of the decree upon her rights to the use of the waters of the Laramie River, are set forth in the following words and figures:

"In rendering its decision, the Court failed to apply the doctrine of equitable apportionment as defined in the case of Kansas vs. Colorado. According to the testimony submitted in this case, Colorado produces more than one-half of the water of the Laramie River. Under the decision herein, Colorado is limited to 37,750 acre-feet annually (Skyline, 18,000, plus Colorado Meadows 4,250, plus Laramie-Poudre Tunnel, 15,500). The Court determines the water supply available to the Wyoming lands as follows:

"Laramie river at Wood's	170,000 a.-ft.
Little Laramie river	93,000 "
Lower tributaries	25,000 "
Total	288,000 "
Adding the Colorado Trans-mountain diversion and consumption	22,250 "
The total water supply will be	310,250 "

"The 37,750 acre-feet annual Colorado allotment is about 13 per cent of the Basin water supply, and the Wyoming allotment is about 87 per cent of the total water supply."

"Under the court's analysis, Colorado will receive for utilization approximately one-eighth of the Laramie Basin water supply and Wyoming seven-eighths, notwithstanding Colorado produces one-half of the water supply * * *.

"The fact that both States within their borders recognize the doctrine of prior appropriation does not take away the sovereignty of either State. Under the circumstances set forth in this case Colorado has not, in our opinion, received an equitable proportion of the waters of the Laramie river, and, unless under the facts herein, the court desires to adopt a rule different from that in the Kansas-Colorado case, a greater proportion than one-

eighth of the water of the Laramie river should be allotted to Colorado."

DEPARTMENTAL CONSTRUCTION OF THE DECREE BY COLORADO OFFICIALS

On March 14th, 1923, the Chief Clerk in the office of the State Engineer of Colorado, Mr. C. C. Hezmalhalch, in response to an inquiry received in that office from one, Agnes Zimmerman, stated as follows:

> "Replying to your letter of the 7th inst. in which you ask as to whether or not Laramie and Lost Lakes have been covered by filings.
>
> "I have searched through the records and have been unable to find filing covering these specific locations. From available data we have here these lakes are in the Larimie River water shed and at this date would not be subject to appropriation on account of the Wyoming-Colorado water suit."

In the case of The La Plata River and Cherry Creek Ditch Company v. M. C. Hinderlider, as State Engineer of the State of Colorado, et al., pending in the Supreme Court of the State of Colorado, the Attorney General of Colorado, at Page 62 of his brief, filed in said cause, construes the Wyoming v. Colorado decree, 259 U. S. 419, 260 U. S., Page 1, as follows:

"WYOMING v. COLORADO

> "We come then to the much discussed opinion in the case of Wyoming v. Colorado, 259 U. S. 419, which, plaintiff asserts, removes the water rights here in question from the jurisdiction of the states and their compact, because the relative dates of appropriation determine the rights of individual water users on an interstate stream regardless of state lines.
>
> "While there may be some basis for such a contention we submit that a closer study of the opinion and the amended decree (260 U. S. 1) demonstrates that this is not its real import.

"The Court, in a measure recognized the underlying principle of the doctrine of prior appropriations in making an apportionment of the waters of the river between Colorado and Wyoming to the extent of allocating sufficient water to protect their established development. But the court did not establish the relative status of individual appropriations in the two states.

"The opinion and the amended decree, when read together, reveal that a definite apportionment is made to each state and the local distribution among the numerous appropriators is left to state officials acting under state laws.

"In determining the quantum allocated to each state the court departed from the doctrine of prior appropriation. It allocated to each state a portion of the 'average dependable flow' of the river which it determined by eliminating years of heavy flow.

"It placed upon Wyoming the entire burden of providing storage to equalize the annual flow without respect to relative priorities. It confirmed in Colorado the right to perpetually divert not more than 15,500 acre-feet annually through its tunnel enterprise regardless of the effect of such diversion upon senior appropriators in Wyoming and notwithstanding the fact that the court had already found the tunnel enterprise to be the most junior appropriator in either state."

CONSTRUCTION OF THE DECREE BY WYOMING

Wyoming, in Paragraph Five of her bill of complaint in this case, sets forth her understanding and scope of said decree in the former Wyoming-Colorado case, supra, as follows:

"That this Honorable Court further found the entire water supply available for the proposed Colorado appropriation and the Wyoming appropriations down to and including the diversion for the Wheatland district is 288,000 acre-feet per annum; and that there are some existing Colorado appropriations having priorities entitling them to precedence over many of the Wyoming appropriations; that these recognized Colorado appropriations are 18,000

acre-feet to be diverted by what is known as the Skyline ditch diversion, and 4,250 acre-feet for the irrigation of that number of acres of native-hay meadows in the Laramie valley in Colorado; and that these recognized Colorado appropriations, aggregating 22,250 acre-feet, were not to be deducted from the 288,000 acre-feet, that being the available annual supply after they are satisfied; and that thus the total available annual supply of water for irrigation, in Wyoming and Colorado out of the waters of the Laramie river and its tributaries, was said 288,000 acre-feet of water, and said 22,250 acre-feet of water; or a total available annual supply of water for irrigation of lands in Colorado and Wyoming from the Laramie river and its tributaries in the total sum of 310,250 acre-feet of water; in addition to the waters of Sand Creek, which rises in Colorado and extends into the Laramie plains in Wyoming, and discharges into Hutton Lake, a few miles from the Laramie River, and the waters of which creek, for reasons stated in the opinion, were not regarded by this Honorable Court as a factor in the controversy;"

SUBJECT MATTER OF THIS SUIT

The subject matter of this suit is the enforcement of the decree as rendered in the former Wyoming-Colorado case, supra, which determined the relative rights of the States of Wyoming and Colorado in the use of the waters of the Laramie River, an interstate stream, and its tributaries. Defendant State of Colorado contends that this Honorable Court has no jurisdiction to enforce this decree and says the bill of complaint should be dismissed because of this alleged want of jurisdiction.

The privilege of the complainant State of Wyoming to come into this Court and obtain protection of her relative rights to divert and appropriate to beneficial use in the State of Wyoming, its equitable apportionment of the waters of the Laramie River, an interstate stream, as determined by said former decree of this Honorable Court in the case of Wyoming vs. Colorado, supra, is sustained by the following cases:

Missouri vs. Illinois, 180 U. S. 496;
Georgia vs. Tennessee Copper Co., 206 U. S. 230; 237 U. S. 474;
Kansas vs. Colorado, 185 U. S. 125; 206 U. S. 46;
New Jersey vs. State of New York, 283 U. S. 336;
Connecticut vs. Commonwealth of Massachusetts, 282 U. S. 660;
Hudson Water Co. vs. McCarter, 209 U. S. 353.

The jurisdiction of this Court is challenged by defendant on the ground that the matters set forth in the bill of complaint do not constitute a controversy between the State of Wyoming and the State of Colorado.

In support of this contention, defendant argues that the decree rendered in the former Wyoming-Colorado case cannot be construed to limit diversions other than the Laramie-Poudre Tunnel; that the said decree does not operate to determine as a whole the relative right of the defendant State of Colorado, and all parties claiming rights under the laws of the State of Colorado, to divert and apply to beneficial use the waters of the Laramie River in the State of Colorado. In other words, Colorado now contends that the former suit was not one between the contending states for the purpose of determining the relative rights of each state to the use of the waters of the Laramie River, an interstate stream.

In so contending, defendant challenges the construction of said decree by this Honorable Court.

See State of Connecticut vs. Commonwealth of Massachusetts, supra;
State of New Jersey vs. State of New York, et al., supra.

Colorado now repudiates her former position as to the object of the Wyoming-Colorado suit, supra, where Colorado stated it was not a suit between private parties but rather one between the sovereign states of Wyoming and Colorado, which contention is set forth in the following quotation from Colorado's brief, Vol. 1, Page 128 to 145, filed in this Court October, 1916, Term, Original No. 7:

"THE LAW OF THE CASE

"We have now discussed the facts of this case and to them, as summed up, we will endeavor to apply the law of the case.

"When Colorado became a state in 1876, she became sovereign within the limits of her territory except as to the limited and enumerated powers given to the national government. She became the owner, in her sovereign capacity, independent of and behind her people as to all her great natural resources such as air, light and water, with equal rights as the original thirteen states.

> " 'One cardinal rule, underlying all the relations of the States to each other, is that of equality of right. Each State stands on the same level with all the rest. It can impose its own legislation on no one of the others, and is bound to yield its own views to none.'
>
> Kansas vs. Colorado, 206 U. S. 97.

"The State of Colorado and the State of Wyoming respectively have the same equal rights as any one of the thirteen original states, and as to the waters of their interstate streams, their respective rights are the same as to the waters thereof within their limits as though they were one of the original thirteen states, except as to the factors of the waters being of an interstate stream and in an arid country. The controversy is not one between private parties, as in Bean vs. Morris, 221 U. S. 485; Rickey vs. Miller & Lux, 218 U. S. 258, which cases will be hereinafter discussed, but is a case between two sovereign commonwealths insisting respectively upon the waters here in controversy, Colorado insisting upon making the diversion in her right as a sovereign commonwealth and Wyoming insisting in the same capacity on the right being denied.

"Manville Co. vs. Worcester, 138 Mass. 89, decided in 1884, opinion by Mr. Justice Holmes, then of the Supreme Court of Massachusetts and now and for many years last past a Justice of the Supreme Court of the United States, was an action of tort for diverting the waters of a natural

stream in the Commonwealth of Massachusetts and preventing the same from coming to plaintiff's mill in the adjoining state of Rhode Island. The action was treated as an action between private parties. It was held that it would lie upon the ground that the servitude was being exercised with the presumed consent of the Commonwealth of Massachusetts. It is clear, however, throughout the opinion that if the Commonwealth of Massachusetts were objecting, the objection would be effective and that it was competent for Massachusetts to control the great natural resources within her limits. *Inter alia the* court said:

> " 'A concurrence of the laws of both States is as necessary in that case as in the one at bar, to create a liability which can be enforced in either State consistently with principle. * * *
>
> " 'Of course, the laws of Rhode Island cannot subject Massachusetts land to a servitude, and, apart from any constitutional considerations, if there are any, which we do not mean to intimate, Massachusetts might prohibit the creation of such servitudes. So it might authorize any acts to be done within its limits, however injurious to lands or persons outside them. But it does not do either.
>
> " 'It has no more objection to a citizen of Rhode Island owning an easement, as incident to his ownership of land in that State, than it has to his owning it in gross, or to his purchasing lands here in fee. * * * So far as their creation is concerned, the law of Massachusetts governs, whether the mode of creation be by deed or prescription, or whether the right be one which is regarded as naturally arising out of the relation between the two estates; being created, the law of Rhode Island, by permission of that of Massachusetts, lays hold of them and attaches them in such way as it sees fit to land there, Massachusetts being secured against anything contrary to its views of policy by the common traditions of the two States, and by the power over its own territory which *it holds in reserve.*'

"The language contained in this opinion becomes more significant as we read the opinions of the Supreme Court of the United States as to the questions there involved, wherein that court speaks through the same jurist, Mr. Justice Holmes.

"Hudson Water Co. vs. McCarter, 209 U. S. 353, opinion by Mr. Justice Holmes, decided in 1907. Here the question was between a private party and the State of New Jersey, the state being represented by its Attorney General, McCarter. The defendant, the Hudson Water Company, under a contract with the City of Bayonne, in New Jersey, had laid mains for the purpose of carrying water to Staten Island in the State of New York. By other contracts it was to get the water from the Passaic River at Little Falls, where the East Jersey Water Company has a large plant by which the water is withdrawn. The State of New Jersey, reciting the need of preserving the fresh water of the state for the health and prosperity of the citizens, enacted that it should be unlawful to transport the waters of any river of the state into any other state for use therein. Action was brought by the State of New Jersey to enjoin carrying the waters of the Passaic River out of the state. The action was sustained. *Inter alia* the court said:

> " 'But we prefer to put the authority which cannot be denied to the state upon a broader ground than that which was emphasized below, since in our opinion it is independent of the more or less attenuated residuum of title that the State may be said to possess. * * *
>
> " 'It sometimes is difficult to fix boundary stones between the private right of property and the police power when, as in the case at bar, we know of few decisions that are very much in point. But it is recognized that the State as quasi-sovereign and representative of the interests of the public has a standing in court to protect the atmosphere, the water and the forests within its territory, *irrespective of the assent or dissent of the private owners of the land most immediately concerned.* Kansas v. Colorado, 185 U. S. 125, 141, 142; Id. 206 U. S. 46, 99; Georgia

v. Tennessee Copper Co., 206 U. S. 230, 238. What it may protect by suit in this court from interference in the name of property outside of the State's jurisdiction, one would think that it could protect by statute from interference in the same name within. On this principle of public interest and the police power, and not merely as the inheritor of a royal prerogative, the State may make laws for the preservation of game, which seems a stronger case. Geer vs. Connecticut, 161 U. S. 519, 534.'

" 'It appears to us that few public interests are more obvious, indisputable and independent of particular theory than the interest of the public of a State to maintain the rivers that are wholly within it substantially undiminished, except by such drafts upon them as the guardian of the public welfare may permit for the purpose of turning them to a more perfect use.'

" 'But we agree with the New Jersey courts, and think it quite beyond any rational view of riparian rights that an agreement, *of no matter what private owners*, could sanction the diversion of an important stream outside the boundaries of the State in which it flows. *The private right to appropriate* is subject not only to the rights of lower owners but to the initial limitation that it *may not substantially diminish one of the great foundations of public welfare and health.*

" 'We are of opinion, further, that the constitutional power of the State to insist that its natural advantages shall remain unimpaired by its citizens is not dependent upon any nice estimate of the extent of present use or speculation as to future needs. The legal conception of the necessary is apt to be confined to somewhat rudimentary wants, and there are benefits from a great river that might escape a lawyer's view. But the State is not required to submit even to an aesthetic analysis. Any analysis may be inadequate. It finds itself in possession of what all admit to be a great public good, and what it has it may keep and give no one a reason for its will. * * *

" 'It constantly is necessary to reconcile and to adjust different constitutional principles, each of which would be entitled to possession of the disputed ground but for the presence of the others, as we already have said that it is necessary to reconcile and to adjust different principles of the common law. * * * The right to receive water from a river through pipes is subject to territorial limits by nature, and those limits may be fixed by the State within which the river flows, even if they are made to coincide with the state line.'

"The court, in the course of the opinion, says:

" 'Problems of irrigation have no place here.'

"The opinion shows, however, the rights of a sovereign state in the streams of the state, when such right is unaffected by and is not required to be reconciled with the problem of irrigation.

"Walbridge vs. Robinson, 22 Idaho 240, decided in 1912, was an appeal from an order granting a writ of mandate, resulting in a reversal of the lower court. Respondent made an application to the state engineer for a permit to appropriate water from Bear Creek, a branch of Clear Water River, situate in Idaho County. This application was for the diversion of waters to be carried and applied to irrigation in the state of Montana. The permit was issued. Prior to its issuance, a similar permit had been granted for the diversion of waters from Bear Creek to be carried and used in the State of Montana. Subsequent to the issuance of these permits, a contest was filed by the respondents and after a hearing, the state engineer refused to take any action on the matter or grant any relief to either of the parties upon the ground that in issuing the permits he had exceeded his lawful authority in attempting to grant a right for the diversion of waters of that state to be applied to a beneficial use in another state. Thereafter respondents asked that they be given certificate of the completion of their works. The engineer refused to take action on the ground that he had no authority to grant such certificates. A suit was thereupon instituted. Bear Creek was not an interstate stream, but

located wholly within the State of Idaho. There was a declaration of the constitution as to the ownership of waters similar in legal effect to our own. Commenting thereon the court said:

> " 'It is further contended that this latter declaration of the statute is only a written expression of what the law has always been with reference to the public waters of a state.
>
> " 'Freund, in his work on the Police Power of the state, at Sec. 417, seems to entertain this view, and in discussing similar statutes in other states, says: "Such declaration is expressive of what is believed to be the law, and does not intend to make new law."
>
> " 'We think it is clear that the title to the public waters of the state is vested in the state for the use and benefit of all the citizens of the state under such rules and regulations as may be prescribed from time to time by the law-making power of the state. This is not, however, an interest or title in the proprietary sense, but rather in the sovereign capacity as representative of all the people for the purpose of guaranteeing that the common rights of all shall be equally protected and that no one shall be denied his proper use and benefit of this common necessity. * * *
>
> " 'There is no doubt in our minds but that the state in its sovereign capacity is the owner of the waters flowing in the streams thereof and may exercise its authority over the same. If the foregoing propositions be correct, the state has the right to prohibit the diversion of the waters of its stream for use outside of and beyond the boundaries of the state. In other words, as said by the supreme court in Geer v. Connecticut, supra, "The common ownership imports the right to keep the property, if the sovereign so chooses, always within its jurisdiction for every purpose." '

"The sovereign right of each one of the states of this Union of states to own and protect its great natural resources and its privilege to come into this court and ask legal protection of the right to such great natural resources appears through these cases.

"In Missouri vs. Illinois, 180 U. S. 208, and 200 U. S. 496, the latter decided in 1905, opinion by Mr. Justice Holmes; Kansas vs. Colorado, 185 U. S. 125, and 206 U. S. 46, decided in 1906; Georgia vs. Tennessee Copper Co., 206 U. S. 230, 237 U. S. 474, opinion by Mr. Justice Holmes.

"It is clear that there is a sovereign right in the state independent of and behind the title of its citizens in its great natural resources, and that this court has jurisdiction of the legal contest to protect and enforce such rights. Further, that the extent to which a sovereign state may insist on this right largely rests with her. In Hudson Water Co. vs. McCarter, supra, it is said:

> " 'It finds itself in possession of what all admit to be a great public good, and what it has it may keep and give no one a reason for its will.'

"In Missouri vs. Illinois, the court recognized the right of Missouri to come by original suit into this court and protect its citizens against any contamination that might arise through sewage of the city of Chicago being turned into a tributary of the Missouri River.

"In Georgia vs. Tennessee Copper Company, a bill in equity was filed in pursuance of a resolution of the legislature and by direction of the Governor of Georgia, to enjoin defendant copper company from discharging noxious gas from their works in Tennessee over the plaintiff's territory. *Inter alia*, the court said:

> " 'The case has been argued largely as if it were one between *two private parties;* but it is not. The very elements that would be relied upon in a suit between fellow-citizens as a ground for equitable relief are wanting here. The State owns very little of the territory alleged to be affected, and the damage to it capable of estimate in money, possibly, at least, is small. This is a suit by a State for an injury to it in its capacity of quasi-sovereign. In that capacity the State has an interest independent of and behind the titles of its citizens, in all the earth and air within its domain. It has the last word as to whether its mountains shall be stripped of their forests and its

inhabitants shall breathe pure air. It might have to pay individuals before it could utter that word, but with it remains the final power. The alleged damage to the State as a private owner is merely a make-weight, and we may lay on one side the dispute as to whether the destruction of forests has led to the gullying of its roads. * * *

"'They (states) did not renounce the possibility of making reasonable demands on the ground of their still remaining quasi-sovereign interests; and the alternative to force is a suit in this court. * * *

"'The States by entering the Union did not sink to the position of *private owners subject to one system of private law.* * * * Without excluding the consideration that equity always takes into account, we cannot give the weight that was given them in argument to a comparison between the damage threatened to the plaintiff and the calamity of a possible stop to the defendants' business, the question of health, the character of the forests as a first or second growth, the commercial possibility or impossibility of reducing the fumes to sulphuric acid, the special adaptation of the business to the place.

"'It is a fair and reasonable demand on the part of a sovereign that the air over its territory should not be polluted on a great scale by sulphurous acid gas, that the forests on its mountains, be they better or worse, * * * should not be further destroyed or threatened by the act of persons beyond its control, that the crops and orchards on its hills should not be endangered from the same source. If any such demand is to be enforced this must be, notwithstanding the hesitation that we might feel if the suit were *between private parties*, and the doubt whether for the injuries which they might be suffering to their property they should not be left to an action at law. * * *

"'Whether Georgia by insisting upon this claim is doing more harm than good to her own citizens is for her to determine. The possible disaster to those outside the State must be accepted as a consequence of her standing upon her extreme rights.'

"The cause of the suit was an insistence upon the right of Georgia to be protected in the reasonable enjoyment of her rights of sovereignty. The plaintiff prevailed. The case did not proceed upon the theory of the litigation being between private parties, but upon the fact of peculiar rights inhering in litigants with sovereign powers.

"Rickey Land & Cattle Co. vs. Miller & Lux, 218 U. S. 258, decided in 1910, opinion by Mr. Justice Holmes, was an action between private parties in reference to the waters of an interstate stream and the character of that action is carefully distinguished from a case wherein the sovereignty itself is insisting upon its right to the waters of a stream. Miller & Lux, the corporation using the water of Walker River in Nevada, claimed rights therein. Two branches of the river rise in California and unite in Nevada above Miller & Lux. Rickey used water of both branches in California and claimed rights superior to parties lower down. In 1902 Miller & Lux brought suit in the circuit court for the district of Nevada against Rickey and certain other defendants to enjoin interference with its use of water. Rickey pleaded that the diversion by him was in California and later answered. After appearing, he organized the petitioning corporation and conveyed his rights in California to it. In 1904 this corporation began two actions in the state court of California against Miller & Lux, and others, to quiet its title to certain water rights on the west fork and east fork, supra. In December, after they were served with process in the last mentioned suit, other defendants in the bill brought by Miller & Lux brought a cross bill against Rickey to establish their priorities. In 1906 the bills in these present cases were brought by Miller & Lux to restrain proceedings in the California actions on the ground that the Federal Court had acquired jurisdiction before the California actions were begun. Injunctions were granted. *Inter alia* the court said:

> " 'The petitioner contends that there is no conflict of jurisdiction, and that the proceedings in the California court should go on. Its argument is this: When a right is asserted in favor of land in one jurisdiction over land in another, different principles are

involved from those that suffice when both parcels are subject to the same law. When such rights have been recognized, it has been on the ground of an assumed "concurrence between the two states, the one, so to speak, offering the right, the other permitting it to be accepted. Manville Co. vs. Worcester, 138 Mass. 89." Missouri vs. Illinois, 200 U. S. 496, 521. But still there are two parcels of land subject to different systems of law; and although the rights and liabilities in respect of each may require a consideration of the other if they are to be dealt with completely, the fact remains that each may be regulated by the state where the land lies according to its sovereign will. Kansas vs. Colorado, 206 U. S. 46, 93. If, then, the courts of one state are about to deal with one parcel they should not be indirectly interfered with by a foreign court that has no power to control the use of the *res*. It is said to be a general principle that apart from some privity, such as is created by contract, trust, or fraud, courts of equity recognize the impropriety of using their power over the person to achieve such a result. (Citing cases.) It is conceivable, to be sure, that the decisions of this court may determine that the States have rights as against each other *in invitum* in streams that flow through the land of both. Kansas vs. Colorado, 206 U. S. 46, 84; Missouri vs. Illinois, 200 U. S. 496, 519-20. These rights may vary according to the system of law required by natural conditions. They may be more or less analogous to common law rights between upper and lower proprietors, where irrigation is not necessary, as in most of the older states. See New York vs. Pine, 185 U. S. 93, 96. There may be some, perhaps limited, right of appropriation in the upper state, at least in the water shed of the stream, where irrigation is the condition of using the land. See Kansas vs. Colorado, 206 U. S. 46, 100-104, 117. *But whatever this court may decide, if a private owner should derive advantage from such a decision it would not be in his own right, but by reason of and subordinate to the rights of his state,* and those rights, the peti-

tioner insists, can, or a least should be, determined only in a suit brought by the state itself. * * * To affect a purchaser with a suit against his vendor, it is said that at least the *res* must be within the territorial jurisdiction of the court in which the suit is brought. See Fall vs. Eastin, 215 U. S. 1.

"'We are of the opinion that the petitioner fails to establish the conclusion for which it contends. The alleged rights of Miller and Lux involve a relation between parcels of land that cannot be brought within the same jurisdiction. This relation depends as well upon the permission of the laws of Nevada as upon the compulsion of the laws of California. It is true that the acts necessary to enforce it must be done in California, and require the assent of that state so far as this court does not decide that they may be demanded as a consequence of whatever right, if any, it may attribute to Nevada. But, leaving the latter possibility on one side, if California recognizes private rights that cross the border line, the analogies are in favor of allowing them to be enforced within the jurisdiction of either party to the joint arrangement.'

"The decree below was approved. The court, however, makes it clear that the suit was between private parties and that the right of land owned by a private party in Nevada to claim a servitude upon the California lands was based upon the assumed consent of California. Particularly worthy of note is the contention of petitioner, the reasons assigned in which the court does not apparently differ from but only differs in the conclusion. In this argument it is recognized that the rights of individuals in waters of an interstate stream are subordinate and inferior to the rights that the sovereign may claim when it asserts its own.

"Bean vs. Morris, 221 U. S. 485, decided in 1910, opinion by Mr. Justice Holmes, is again a suit between private parties over the waters of an interstate stream, and the learned justice keeps in bold relief that there is a distinction between such a contention when the litigants are

sovereign states. The suit was by respondent Morris to prevent petitioners from so diverting the water of Sage Creek in Montana as to interfere with an alleged prior right of Morris by appropriation in Wyoming. Afterwards Howell was allowed to intervene and make similar claim. Sage Creek, non-navigable, joins Stinking Water in Wyoming, the latter flows into Big Horn and then back into Montana and unites with the Yellowstone. Decree went for Morris and for Howell subject to the claim of Morris, both parties being prior in time and right to the petitioners. It was admitted in argument that but for the fact that the prior appropriation was in Wyoming and the interference in Montana, the decree would be right. The court, *inter alia*, said:

> " 'So we pass at once to the question of private water rights as between users in different states.
>
> " 'We know no reason to doubt, and we assume, that, subject *to such rights as the lower state might be decided by this court to have*, and to vested private rights, if any, protected by the Constitution, the State of Montana has full legislative power over Sage Creek while it flows within that state. Kansas vs. Colo., 206 U. S. 46, 93-95. Therefore, *subject to the same qualifications*, we assume that the concurrence of the laws of Montana with those of Wyoming is necessary to create easements, or such private rights and obligations as are in dispute, across their common boundary line. Missouri vs. Illinois, 200 U. S. 496, 521; Rickey Land and Cattle Company vs. Miller and Lux, 218 U. S. 258, 260. But with regard to such rights as came into question in the older States, *we believe that it always was assumed, in the absence of legislation to the contrary*, that the States were willing to ignore boundaries, and allowed the same rights to be acquired from outside the state that could be acquired from within.' (Mannville Co. vs. Worcester, 138 Mass. 89, and other cases cited.) 'There is even stronger reason for the same assumption here. Montana cannot be presumed to be intent on suicide, and there are as many if not more cases in which it would lose as there are in which it would gain, if it invoked

a trial of strength with its neighbors. * * * The doctrine of appropriation has prevailed in these regions probably from the first moment that they knew any law, and has continued since they became territory of the United States.

"'It was recognized by the statutes of the United States, while Montana and Wyoming were such territory * * * and is recognized by both States now. Before the state lines were drawn, of course, the principle prevailed between the lands that were destined to be thus artificially divided. Indeed, Morris had made his appropriation before either state was admitted to the Union. The only reasonable presumption is that the States, upon their incorporation, continued the system that had prevailed theretofore, *and made no changes other than those necessarily implied or expressed.* * * * It follows from what we have said that it is unnecessary to consider what limits there may be to the powers of an upper State, if it should seek to do all that it could. The grounds upon which such limits would stand are referred to in Rickey Land and Cattle Company vs. Miller and Lux, 218 U. S. 258, 261.'

"The decree below is affirmed, the court finding that the Wyoming lands held a servitude upon the Montana lands upon the theory that as between private parties, the State of Montana was presumed to have consented, but is strongly suggestive that the right to appropriate at the expense of Montana was subject to the will of Montana as a state and such limits as might be put upon her sovereignty by the doctrine of interstate waters.

"The great case in which the rights of sovereign states in the waters of an interstate stream, where the problems of irrigation had place, are presented, discussed and decided in Kansas vs. Colorado, 206 U. S. 46, decided in 1906, opinion by Mr. Justice Brewer. Of this case a great lawyer and an eloquent senator from this commonwealth recently said in the Senate of the United States:

"'The decision in the case of Kansas vs. Colorado is one of the great opinions of the Supreme Court of the United States. To my mind it easily ranks with the most notable judicial pronouncements of that great tribunal and, as time passes, I believe that fact will be more and more recognized; perhaps I should say particularly with reference to its definition of the powers of the government and the distinction it so clearly draws between those powers and the reserved powers of the states.'

"Kansas brought suit against the State of Colorado and a number of private ditch companies for the purpose of enjoining them from diverting waters from the Arkansas River. The State of Colorado appeared insisting upon her rights in the stream as one of her sovereign rights. The ditch companies answered, setting up their priorities. Proof was adduced as to the priorities of certain ditches in Kansas earlier in point of time than Colorado ditches and which Kansas ditches, the evidence showed, were deprived of water by the Colorado diversions. The Government of the United States intervened. Its bill of intervention was dismissed upon the ground that it did not own the waters of the Arkansas River, that it had no rights therein as the question of navigation did not arise, and it was dismissed from the suit. It is difficult to understand, after the ruling in this great and luminous case, that the Government of the United States still insists, through some of its departments, on being interested in non-navigable streams. It may be said, however, that when waters are sought to be appropriated from the streams of any state for any national government project, the National Government deems it to be the safe course to comply with the state laws as any other consumer would in his efforts to acquire rights by prior appropriation in the waters of a stream.

"The careful reasoning of the court in approaching its ruling in this case, that it was keeping constantly before its mind in deciding the grave question it was ruling between two sovereign commonwealths, the principle laid

down by the court in the sewage case, Missouri vs. Illinois, 200 U. S. 521, wherein it is said:

> " 'Before this court ought to intervene the case should be of serious magnitude, clearly and fully proved, and the principle to be applied should be one which the court is prepared deliberately to maintain against all considerations on the other side.'

"In perhaps no case in the history of this great court has there been shown greater and more thoughtful care in guarding the rights of the states than in this case of Kansas vs. Colorado. An unjust decision might have destroyed the agricultural resources of a state which, resting upon the crest of the continent where the waters begin which flow to the east, to the west, to the north and the south, and where a declaration of the applicability of the riparian rights would have visited with destruction not only the development of the Arkansas valley, but the other great valleys of Colorado, the court, conforming to the principles of common law, international law and state law, rendered a decision which fully protected the rights of the litigants and declared no precedent that would be destructive to the rights of the states in future litigation.

"The pith of this ruling, when fully considered, is that the court of law adjusted itself to conditions as it found them, aiming to administer the highest justice between man and man; that applying its principles and all other principles of jurisprudence in the relations between the states, it was the controlling purpose of the court to work out justice; that as to this interstate stream in the reasonable exercise of their respective sovereign rights, each of the states was entitled to a reasonable part of the waters; that the court would not consider the question of private rights among the ditch companies; that the disposition of the rights of the two states would be a disposition of the rights of the private parties, for the reason that the rights of the private parties were subordinate to the rights of the states; that if the court found, as it did find, that Colorado was not diverting from this stream any more than a reasonable part of the waters of the stream and for that reason the bill must be dismissed, that the

rights of the private ditch companies and their priorities were immaterial.

"In conclusion, the court held that Colorado was not taking more than a reasonable part of the waters of this interstate stream; that she was entitled to take a reasonable part in the exercise of her rights of sovereignty; that even though this exercise of a right of sovereignty worked some prejudice to Kansas, no legal wrong was done; that if, at any time it might appear that Colorado was taking more than a reasonable part of the waters of this stream, Kansas could justly come again. The bill was dismissed.

"Excerpts from this decision pertaining to the question before us are:

> "'But it is useless to pursue the inquiry further in this direction. It is enough for the purposes of this case that each State has full jurisdiction over the lands within its borders, including the beds of streams and other waters.' 93.
>
> "'But when the States of Kansas and Colorado were admitted into the Union they were admitted with the full powers of local sovereignty which belonged to other States. * * * and Colorado by its legislation has recognized the right of appropriating the flowing waters to the purposes of irrigation.' 95.
>
> "'"Can it be that the great multitude of interstate commercial transactions are freed from the burdens created by the common law as so defined, and are subject to no rule except that it be found in the statutes of Congress? We are clearly of opinion that this cannot be so, and that the principles of the common law are operative upon all interstate commercial transactions except so far as they are modified by Congressional enactment."' 96.
>
> "'For after all, the common law is but the accumulated expressions of the various judicial tribunals in their efforts to ascertain what is right and just between individuals in respect to private disputes.' 97.
>
> "'Nor is our jurisdiction ousted, even if, because Kansas and Colorado are States sovereign and in-

dependent in local matters, the relations between them depend in any respect upon principles of international law. International law is no alien in this tribunal.' 97.

" ' "Sitting, as it were, as an international, as well as a domestic tribunal, we apply Federal law, state law, and international law, as the exigencies of the particular case may demand."

" 'One cardinal rule, underlying all the relations of the States to each other, is that of equality of right. Each State stands on the same level with all the rest.' 97.

" 'Yet, whenever, as in the case of Missouri v. Illinois, 180 U. S. 208, the action of one State reaches through the agency of natural laws into the territory of another State, the question of the extent and the limitations of the rights of the two States becomes a matter of justiciable dispute between them, and this court is called upon to settle that dispute in such a way as will recognize the equal rights of both and at the same time establish justice between them. In other words, through these successive disputes and decisions this court is practically building up what may not improperly be called interstate common law.' 97, 98.

" 'It will be perceived that Kansas asserts a pecuniary interest as the owner of certain tracts along the banks of the Arkansas and as the owner of the bed of the stream. We need not stop to consider what rights such private ownership of property might give.' 98.

" 'The action complained of is state action.'

" 'The controversy arises, therefore, above a mere question of local private right and involves a matter of state interest, and must be considered from that standpoint.' 99.

" 'May we not consider some appropriation by Colorado of the waters of the Arkansas to the irrigation and reclamation of its arid lands as a reasonable exercise of its sovereignty and as not unreasonably trespassing upon any rights of Kansas?' 102.

"'What is such a just and reasonable use, may often be a difficult question, depending on various circumstances. To take a quantity of water from a large running stream for agricultural or manufacturing purposes, would cause no sensible or practicable diminution of the benefit, to the prejudice of a lower proprietor; whereas, taking the same quantity from a small running brook passing through many farms, would be of great and manifest injury to those below, who need it for domestic supply or watering cattle; and therefore it would be an unreasonable use of the water, and an action would lie in the latter case and not in the former. It is, therefore, to a considerable extent a question of degree; still, the rule is the same, that each proprietor has a right to a reasonable use of it, for his own benefit, for domestic use, and for manufacturing and agricultural purposes.' 103-4.

"'At one time there were some irrigating ditches in these western (Kansas) counties, which promised to be valuable in supplying water and thus increasing the productiveness of the lands in the vicinity of the stream, and it is true that those ditches have ceased to be of much value, the flow in them having largely diminished.

"'It cannot be denied in view of all the testimony * * * that the diminution of the flow of water in the river by the irrigation of Colorado has worked some detriment to the southwestern part of Kansas, and yet when we compare the amount of this detriment with the great benefit which has obviously resulted to the counties in Colorado, it would seem that equality of right and equity between the two States forbids any interference with the present withdrawal of water in Colorado for purposes of irrigation.' 113-114.

"'Summing up our conclusions, we are of the opinion * * * that the appropriation of the waters of the Arkansas by Colorado, for purposes of irrigation, has diminished the flow of water into the State of Kansas; that the result of that appropriation has been the reclamation of large areas in Colorado,

transforming thousands of acres into fertile fields and rendering possible their occupation and cultivation when otherwise they would have continued barren and unoccupied; that while the influence of such diminution has been of perceptible injury to portions of the Arkansas Valley in Kansas, particularly those portions closest to the Colorado line, yet to the great body of the valley it has worked little, if any, detriment, and regarding the interests of both States and the right of each to receive benefit through irrigation and in any other manner from the waters of this stream, we are not satisfied that Kansas has made out a case entitling it to a decree. At the same time it is obvious that if the depletion of the waters of the river by Colorado continues to increase there will come a time when Kansas may justly say that there is no longer an equitable division of benefits and may rightfully call for relief against the action of Colorado, its corporations and citizens in appropriating the waters of the Arkansas for irrigation purposes.

" 'The decree, which, therefore, will be entered will be one dismissing the petition of the intervener, without prejudice to the rights of the United States to take such action as it shall deem necessary to preserve or improve the navigability of the Arkansas River. The decree will also dismiss the bill of the State of Kansas as against all the defendants, without prejudice to the right of the plaintiff to institute new proceedings whenever it shall appear that through a material increase in the depletion of the waters of the Arkansas by Colorado, its corporations or citizens, the substantial interests of Kansas are being injured to the extent of destroying the equitable apportionment of benefits between the two States resulting from the flow of the river.' 117-118.

"The ruling was that each state was entitled to an equitable apportionment of benefits between the two states resulting from the flow of the river, which equitable apportionment of benefits could only be secured

through an equitable apportionment of the waters of this interstate stream.

"The doctrine of prior appropriation has at all times obtained in Colorado and Wyoming.

> " 'The doctrine of appropriation has prevailed in this region probably from the first moment that they knew of any law, and has continued since they became territory of the United States.'

"Bean vs. Morris, 221 U. S. 485.

"It was recognized by the statutes of the United States while Colorado and Wyoming were territories.

"United States vs. Rio Grande, 174 U. S. 690.

"Gutierres vs. Albuquerque, 188 U. S. 545.

"When Colorado became a state in 1876, in its sovereign capacity it became the owner, for the benefit of its people in common, of all the waters of the streams of the state.

"See—Walbridge vs. Robinson, 22 Ida. 240.

"Also—Colorado Enabling Act, Colorado Constitution, and Proclamation of President, supra.

"Colorado, in this suit, insists upon her claim to divert 91,000 acre-feet of water of this interstate stream. This is a reasonable exercise of her rights of sovereignty as to this interstate stream. She requires the water for necessary public uses. It will produce larger results within her boundaries than elsewhere. She is not unreasonably trespassing upon Wyoming in thus reasonably exercising her rights. The only reasonable way in which this right can be availed of is to apply the waters to lands lying within another watershed. The right to carry water to another watershed is necessary for its beneficial use within the State of Colorado.

"In Coffin, et al. vs. Left Hand Ditch Co., 6 Colo. 443, it is said:

> " 'The doctrine of priority of right by priority of appropriation for agriculture is evoked, as we have seen, by the imperative necessity for artificial irrigation of the soil. And it would be an ungenerous and inequitable rule that would deprive one of its benefit simply because he has, by large expenditure of time

and money, carried the water from one stream over an intervening watershed and cultivated land in the valley of another. It might be utterly impossible, owing to the topography of the country, to get water upon his farm from the adjacent stream; or if possible, it might be impracticable on account of the distance from the point where the diversion must take place and the attendant expense; or the quantity of water in such stream might be entirely insufficient to supply his wants. It sometimes happens that the most fertile soil is found along the margin or in the neighborhood of the small rivulet, and sandy and barren land beside the larger stream. To apply the rule contended for would prevent the useful and profitable cultivation of the productive soil, and sanction the waste of water upon the more sterile lands. It would have enabled a party to locate upon a stream in 1875, and destroy the value of thousands of acres, and the improvements thereon, in adjoining valleys, possessed and cultivated for the preceding decade. Under the principle contended for, a party owning land ten miles from the stream, but in the valley thereof, might deprive a prior appropriator of the water diverted therefrom whose lands are within a thousand yards, but just beyond an intervening divide.' 449-450.

"In the syllabus of the same case and supported by the opinion, it appears:

> " 'The right to water acquired by prior appropriation is not in any way dependent upon the *locus* of its application to the beneficial use designed.'

"Other cases in Colorado announcing the same doctrine are:

"Thomas vs. Guiraud, et al., 6 Colo. 530-532.

"Hammond vs. Rose, et al., 11 Colo. 524-526.

"Openlander vs. Left Hand Ditch Co., 18 Colo. 142-144.

"Coffin vs. Left Hand Ditch Co. is cited with approval In Moyer vs. Preston, 6 Wyo. 308, 313, 321; Willey, et al. vs. Decker, 11 Wyo. 496, 516, 528, 530.

"The Left Hand Ditch case is cited with approval in support of the doctrine that water may be diverted to non-riparian lands in Boquillas Cattle Co. vs. Curtis Co., 213 U. S. 339, 345; also 181 Fed. 1014, 1015.

"An exhaustive discussion of the practice and the law of inter-watershed diversions is set forth in Vol. 2 of this brief.

"We respectfully submit that when the law is applied to the facts in this case, it appears that the appropriations by Colorado to the irrigation and reclamation of its arid lands of 91,000 acre-feet of the run-off of the Laramie River is but a reasonable exercise of its sovereignty and does not constitute an unreasonable trespass upon the rights of Wyoming, and further, that she is simply availing herself of her own great natural resources in making this proposed diversion. The action should be dismissed at the cost of complainant."

COLORADO'S CONSTRUCTION OF WYOMING-COLORADO DECISION IN CASE OF COLORADO VS. KANSAS

At the October Term of this Honorable Court in 1927, Colorado, by leave of Court, filed, as complainant, her original bill of complaint against the State of Kansas, et al., and the following quotation taken from said bill sets forth Colorado's construction of the Wyoming-Colorado decree and the scope of the proceeding in that case.

Paragraph 7, Pages 17 and 18:

"* * * The propriety, political wisdom and economic necessity of maintaining and dealing with state rights in the interstate streams as a whole between the states only is recognized not only by the decisions of this Honorable Court in dealing with the controversy between Kansas and Colorado hereinafter referred to, but also the controversy between Wyoming and Colorado recently before this Court, * * *."

Colorado, in said Colorado vs. Kansas, case, argues that state rights in the interstate streams as a whole between the

states only are recognized, not only by the decision of this Honorable Court in dealing with the controversy between Kansas and Colorado, but also in the controversy between Wyoming and Colorado before this Court. Here Colorado cites the former Wyoming-Colorado case as authority for the contention that the question of determining the rights in interstate streams must be dealt with as a whole between states and that the question of rights of individual appropriators in the contending states cannot be recognized.

COLORADO'S POSITION ON THE QUESTION OF CONTROL AND OWNERSHIP OF FLOWING WATERS WITHIN THE STATE AS STATED IN CASE OF COLORADO VS. KANSAS, ET AL.

FLOWING WATERS OF STATE: PROPERTY OF THE STATE

Paragraph 5, Page 9:

"* * * today and from its admission to the Union, the State, by its Constitution and laws, has treated all of the flowing water in the state as the property of the state itself, permitting its citizens to acquire only usufructuary rights subordinate to the state ownership, given for the time being to private agencies but subject and subservient always to the dominant will of the State. * * *"

COLORADO'S RIGHTS IN WATERS OF INTERSTATE STREAM SUBJECT TO DECISIONS OF U. S. SUPREME COURT

Paragraph 5, Pages 9 and 10:

"* * * The State of Colorado * * * has by numerous acts of law and policy, supported by the interpretations of its courts, claimed the right to use within its borders and to distribute all of the waters originating and flowing therein to such of its citizens and inhabitants as it chose to select, without regard to the claims of the inhabitants or citizens of any other state, including the State of Kansas, and subject only to such limitations as

this Honorable Court might determine to exist between this State as a whole and other sovereign states as a whole, * * *."

DECISIONS OF STATE SUPPORT CLAIM OF STATE OWNERSHIP OF WATERS OF STATE

Paragraph 6, Page 11:

"These provisions have been frequently interpreted by the courts of the State as declaratory of the public policy that the waters of the streams of the State belong to and are controlled and properly administered by the State in its sovereign capacity as a matter of public and governmental activity. * * *"

ALL DIVERSIONS UNDER CONTROL OF PUBLIC OFFICIALS

Paragraph 6, Page 15:

"* * * No person desiring water can divert the same except, if, as and when authorized by the Water Commissioner, and in both theory and practice no water is diverted except by the order and direction of the public officials in control of the stream. * * *"

STATE IN SOVEREIGN CAPACITY OWNS FLOWING WATERS IN THE STATE

Paragraph 7, Page 15:

"Under said system of ownership and control of the streams by the State in its sovereign capacity * * *."

UPON DISCONTINUANCE OF USE WATER REVERTS TO FUND OF SOVEREIGN

Paragraph 7, Pages 16 and 17:

"* * * Moreover, upon discontinuance of use, the usufructuary privilege vanishes on principles of abandon-

ment, and under special proceedings provided therefor the right is cancelled on consideration of the special facts surrounding it, and the amount of water formerly diverted reverts to the common fund of the sovereign. • • •"

VARYING LOCAL CONDITIONS MAKE IT IMPERATIVE SETTLEMENT OF INTEREST IN INTERSTATE STREAMS BETWEEN SOVEREIGN STATES, NOT BETWEEN INDIVIDUALS

Paragraph 7, Pages 18 and 19:

"The recognition of the fundamental principles of ownership, control and administration of the waters of the streams by the States in their sovereign capacities, in conformity with local necessities, and for the general welfare of each of the States, and with administrative rules and statutes varying according to such local necessities and responsive only to the sovereign will of the States in which the use of the natural element is essential to the very existence of the State and its people, and free from claims of foreign servitude save only such as may be fixed by compacts between the states or by decision of this Honorable Court in suits between the sovereign states, not only comports with the fundamental principles of our Federal union of states equal in powers and in all other respects, but likewise comports with human experience in securing the maximum benefits from the use of this fleeting natural element as typified in the experience in the State of Colorado with its local administrative system. The principles of local government which are inherent in all American theory and practice, and the principles of local administration, are typified in the development of water administration thus evolved by a long series of practical experiments. There are immense geographical variances in location between individual users of water in Kansas and many of the principal individual priorities in Colorado, between whom a conflict might be conveniently sought, amounting to a difference between them of hundreds of miles of river channel in isolated mountain gorges or on the open prairie. The administration of rela-

tive usufructuary rights involves the consideration also of the fact that the water flows through different climatic zones subject to varying conditions of rainfall, heat and loss of water under meteorological occasions which vary both the need for water and the actual supply of water available from day to day and from hour to hour. Such factors render imperative the settlement of these matters between sovereign states and not between individuals."

Paragraph 8, Page 20:

"* * * this Honorable Court, in a notable decision and determination, duly made and entered May 13, 1907, duly held, adjudicated and decreed among other things that it had jurisdiction to consider and determine the question of the relative exercise of the sovereignties of the states of Kansas and Colorado upon the waters of the Arkansas River and its tributaries; that the states could and did in their sovereign capacities and as *parens patriae* of the citizens, inhabitants, and the interests and welfare of their population, represent and speak for the great number of persons and institutions in the respective states using the waters of the said river for beneficial purposes, and that the matters should be determined between the two states as a whole on the basis of their respective benefits in the said stream, their requirements and relative dependence thereon in view of climatic, geographical and other conditions, and the equitable principles governing the asserting of both sovereignties on the water flowing therein. * * *"

Paragraph 8, Page 22:

"* * * It was thereby duly adjudicated that the quantum of water represented by the appropriations and diversions existing and carried on within the State of Colorado under its authority in the year 1907 was within the lawful rights of the state, its corporations and citizens, and the continuance of such appropriations and diversions was in legal effect quieted to the State of Colorado, its corporations and citizens. * * *"

Paragraph 10, Pages 23 and 24:

"* * * Relying also upon the doctrine of the foregoing decision to the effect that the relative claims of the two states and the citizens and inhabitants thereof were fixed and determined forever as between the two states as units and were to be thereafter adjudicated and determined as a whole between the two states, and that the distribution within the two states of the benefits of the said river was and would continue to be a matter of internal administration within the limits of each, * * *."

RIGHTS OF INDIVIDUALS CANNOT BE RECOGNIZED

Paragraph 11, Pages 25 and 26:

"* * * Said defendant inhabitants have protested and objected thereto in the United States District Court, have constantly alleged that the matter was one as between the states from which the parties derived their respective rights, that the United States District Court had no jurisdiction in view of the action and determination of this Honorable Court, and that any attempted adjudication of the rights and acts of individual parties was beyond the jurisdiction of the lower courts, and no determination of their respective claims could be arrived at without the participation of the State of Colorado and the State of Kansas as such. The defendants in such cases have also urged what your complainant respectfully submits is the unquestioned fact that, in view of the determinations and actions of this Court, any attempt to adjudicate and put limits upon the rights of individual citizens of the two states could only produce confusion and uncertainty and disorder; that it was impracticable, if the states as a whole were entitled to certain relative benefits, to adjudicate as between the derivative benefits of the citizens thereof without affecting the whole and thereby adjudging the rights and duties of the states in the absence of both; that to permit such litigation was to recognize a right in private citizens of one state to assert and impose a servitude upon the territory and streams of a neighboring state without its consent and to recognize private claims

as independent of and superior to the rights of either state; that the Supreme Court had taken and retained jurisdiction over the controversy at the election and request of the sovereign states involved, and no other court had authority or jurisdiction to affect, diminish or disturb the balance of the rights of the said states except this Court, which alone had jurisdiction of the sovereign states involved."

COLORADO ADMITS JURISDICTION OF UNITED STATES COURT TO DETERMINE RELATIVE RIGHTS OF COLORADO AND KANSAS IN INTERSTATE STREAM

Paragraph 12, Pages 28 and 29:

"* * * the Court, over the objection of the defendants, assumed the right to determine the relative rights of the sovereign State of Colorado and the sovereign State of Kansas in the waters of the Arkansas River. * * *"

Paragraph 12, Pages 30 and 31:

"* * * the rights, history, acts and appropriations of the said plaintiff and also of all of the said defendants were involved in, presented, litigated, considered and determined in the course of the above mentioned original litigation between the states of Kansas and Colorado, and the consequences of the acts, diversions and claims of both were fully presented, involved and litigated in the above mentioned controversy wherein the states of Kansas and Colorado in their sovereign capacities appeared for and represented the acts and rights of their citizens as a whole, respectively. * * *"

INJUNCTION AGAINST INDIVIDUAL USE IN COLORADO WOULD DISRUPT ADMINISTRATION OF SOVEREIGN STATE

Paragraph 14, Page 38:

"* * * Any determination of the rights of individual Kansas appropriators against individual Colorado ap-

propriators alone is impossible of performance or intelligent obedience, would necessarily and immediately affect and confuse thousands of irrigation users every one of whose daily claim to water is interlaced and relative to those who might be sued and is varying every day and hour, and any court injunctions as between individuals in Kansas and those in Colorado would instantly collide with state officers of Colorado who are not and cannot be made parties, and would disrupt the administration of this sovereign state."

PRIVATE RIGHTS DERIVATIVE FROM SOVEREIGN STATE

Paragraph 17, Pages 42 and 43:

"Any private rights which may exist within the State of Kansas are derivative purely from the sovereignty of Kansas under such policy as it may adopt in regard to the riparian doctrine now in force or such other doctrine as it may from time to time in the future develop, and any and all such rights within the State of Kansas are, as in the case of Colorado, to be allocated to such quantum of water or use as the State of Kansas may be entitled to by compact between the states or by equitable principles adjudicated by this Court in a proper proceeding. Colorado and Kansas should both be free, by virtue of their inherent sovereignty which they have surrendered neither to the Federal government nor any other power, to adapt their domestic policy by such present or altered legal doctrines or present or altered administrative machinery as the problems of developing population, changing geographical conditions and other considerations may dictate. Relying upon the determination of this Court in the above mentioned litigation between Kansas and Colorado, Colorado has made great progress in the economic application, scientific use and development of its waters, and even great progress in the development of administrative machinery for the conservation and wise distribution of the quantum of water which it is entitled to divert from the Arkansas River. * * *"

COLORADO CONDEMNS PRIVATE LITIGATION INSTITUTED WITH CONSENT OF STATE OF KANSAS

Paragraph 17, Page 43:

"* * * Notwithstanding the solemn determination therein entered into, citizens of the State of Kansas, by their action have placed the State of Kansas in the position of acquiescing in private litigation in which it has nothing to lose and everything to gain, the result whereof might be to set aside the effects of the said determination between the states of Kansas and Colorado and thereby to place Kansas in the position of gaining by guerrilla warfare what it is forbidden to assert openly and officially as a sovereignty. * * *."

UNITED STATES SUPREME COURT ONLY TRIBUNAL WITH JURISDICTION TO DETERMINE DISPUTE BETWEEN COLORADO AND KANSAS

Paragraph 17, Page 44:

"* * * If the State of Kansas has complaints against the State of Colorado because of diversions within the State of Colorado, or the interpretation given to said adjudication by the State of Colorado, she is bound, by her election and by the express reservation of jurisdiction made by this Court in the case of Kansas against Colorado, to submit any and all such complaints to this Court and this Court only."

Paragraph 18, Page 44:

"* * * the defendant individual appropriators and users of water of the Arkansas River whose rights are derivative from and wholly dependent upon and included within the authority of the State of Colorado. * * *."

COLORADO ADMITS DECREE ENTERED AGAINST STATE IS BINDING UPON ALL WHOSE RIGHTS ARE DERIVED FROM THE STATE

Quoting from Page 15 of the Reply of Colorado:

> "* * * Colorado alleges that none of the said persons or corporations are necessary or proper parties to this cause; that if any should be made parties, all should be made parties, but respectfully represents that, as all of the said rights are derivative from and would be bound by any adjudication or determination against the State of Colorado, it would unnecessarily encumber these proceedings to make any of them parties hereto, * * *."

This Honorable Court, in substance, sustained this contention as advanced by Colorado as to the necessity of making individuals parties in the Colorado-Kansas case, now pending, when it overruled the motion of the defendant, State of Kansas, to have certain named individual water users from the Arkansas River in the State of Colorado made parties to the pending action.

In the case at bar, Colorado contends that even though she, in her quasi-sovereign capacity, represented all of her citizens and all of her interests, in the former Wyoming-Colorado case, the only question determined in the controversy was as to the relative rights on a basis of priority between the appropriators of Wyoming as a whole and the single Colorado claim of the Laramie-Poudre Tunnel Diversion; that the Court did not intend to, and did not limit the rights of any other individual appropriators in the State of Colorado to divert and use the waters of the Laramie River and its tributaries within the boundaries of Colorado.

The analysis of said decree, 259 U. S. 419, in Colorado's petition for a re-hearing, is proof that Colorado's present contention is one of necessity and convenience in an effort to justify her disregard of the terms of said decree.

Colorado, Page 3 of her brief, in support of the motion to dismiss plaintiff's bill of complaint, states:

> "Paragraphs Three to Seven undertake to state the substance and effect of the former decree of this Court.

"In this statement we criticize the allegation in the Fifth paragraph that the Court found that there was a 'total available annual supply of water for irrigation of lands in Colorado and Wyoming from the Laramie River and its tributaries in the total sum of 310,250 acre-feet of water; * * *.'"

The statement criticized is in almost the identical language used by Colorado in her petition for re-hearing, which we have quoted in this brief, supra.

Also, on Page 3 of Colorado's brief in support of said motion, she states:

> "The issues joined in that case did not permit of an adjudication limiting vested rights of those not parties to that litigation nor represented therein, nor did the Court, by anything said in the opinion, intend to work a specific division of the water of this stream between the two states."

At Page 26 of defendant's brief, counsel in support of this contention mis-quote the language of said decree in commenting upon the status of the Skyline Diversion in the amount of 18,000 acre-feet, where it is said:

> "It is impossible to place this appropriation in the same category as that of the tunnel. In the decision of this Court in the former action, it is recognized that the tunnel appropriation will receive its full measure of water allocated to it in all years, and that 'the Wyoming appropriations will receive the water only after it passes down into that state, and must bear whatever risk is incident to the variation of the natural flow.' * * *
>
> "The Court there reached a practical solution whereby the tunnel appropriator had to sacrifice the normal right to take up to the limit of its projected development after all prior rights should be satisfied, and yet it obtained what the Court regarded as equivalent, namely, in effect a preference right to a defined extent. But in the case of the Skyline Ditch there would be no opportunity to balance rights. The Water Supply & Storage Company, owner of this ditch, is unquestionably senior to all except a very few Wyoming appropriations."

The above quotation from defendant's brief is the comment of counsel for defendant upon the language of the decree, 259 U. S. Rep., Page 485, where the Court said:

> "There is one respect, requiring mention, in which Colorado's situation differs materially from that of Wyoming. The water to satisfy the Colorado appropriation is, and in the nature of things must be, diverted in Colorado at the head of the stream; and because of this those appropriations will not be affected by any variation in the yearly flow, but will receive their full measure of water in all years. * * *"

In using the above language the Court was not speaking of the tunnel appropriation only, when it said "the Colorado appropriations", "those appropriations", "their full measure of water". The difference between the language of the decree referred to by Colorado and the interpretation which she places thereon, is that Colorado, in commenting upon this language, says that the Court was talking about the tunnel appropriation, which would receive its full measure. There is no such statement in the decree. The Court speaks of all of the Colorado diversions; the defendant is in error in treating this language as applying to the tunnel appropriation only.

The comment of Colorado, Page 26 of her brief, as to the Tunnel Diversion, is in substance what the Court determined as to all recognized Colorado diversions, that Colorado was guaranteed water for the diversion through the Skyline in the amount of 18,000 acre-feet annually, 4,250 acre-feet annually for the irrigation of meadow lands in Colorado, and the 15,500 acre-feet annually through the Tunnel Diversion, because in all years, both those of scarce precipitation and of abundant rainfall, Colorado could be assured of her ability to take from the headwaters of the Laramie River the full limit fixed by the Court as the annual Colorado allotment, namely, the 37,750 acre-feet, the exact amount which Colorado admitted herself entitled to in her petition for re-hearing.

The single question presented to this Honorable Court is whether Colorado's relative right to the use of the waters of the Laramie River is limited to 37,750 acre-feet per annum, or is the only limitation on Colorado, the 15,500 acre-feet annually, allowed for the tunnel.

On Page 14 of the brief of Colorado, she criticizes Wyoming's position in saying:

> "The complainant, * * * is not willing, * * * to ground its claim solely upon the basis that the former decree was effective to define and limit all other diversions in Colorado taking water from the Laramie, * * *."

On the contrary, Wyoming in this proceeding rests her claim for relief solely upon the contention that the allocated portion of the water to which citizens or corporations, diverting water under the laws of Colorado and under her supervision and with her consent, are limited to the aggregate amount which this Court in said former Wyoming-Colorado decree found as her relative right or equitable interest in the use of the waters of that stream, to be the amount of 37,750 acre-feet annually, and that Colorado, through her officials charged with the administration of the diversion and use of the water of the Laramie River, in Colorado, is ignoring the decree of this Honorable Court which determined the said relative rights of the complainant and defendant in the use of the waters of this interstate stream.

Colorado's understanding of Wyoming's position as portrayed at Page 16 of Colorado's brief, is in error, as Wyoming has never contended that through oversight, or otherwise, in the drafting of the former decree, it was not intended to fix a limitation on all appropriators in Colorado diverting water from the Laramie River, under the control of and with the consent of Colorado.

This Honorable Court would not assume in the entering of said decree that there would be any attempt upon the part of either Wyoming or Colorado to take advantage of the Court's findings as stated in said former decision, by attempting to divert quantities of water in excess of the stated relative amount annually allotted for diversion and use in each of said states, or that either state would construct and operate other and additional means of storage and diversion to take and divert quantities of water from the Laramie River without regard for and in addition to the fixed annual allotments.

Colorado, in the former Wyoming-Colorado case, stated to the Court in connection with the proposed diversion by the Skyline Ditch, as follows:

"* * * The average possible diversion through this ditch is 16,000 acre-feet annually."

In speaking of the total annual diversion by means of the Skyline ditch, 16,000 acre-feet annually, and Sand Creek Diversion, 4,000 acre-feet annually, Colorado stated to the Court:

"* * * These diversions cannot be enlarged. * * *" (See Vol. 1, Page 3, Colorado Brief, Original No. 7)

Colorado, Page 26 of her brief, comments upon the amount of diversions through the Skyline ditch during the years from 1903 to 1912, in support of her contention that the same was not limited to 18,000 acre-feet. Witness A. A. Edwards for Colorado in the former Wyoming-Colorado case, supra, at Page 596, Vol. 1 of the Evidence, stated that the former measurements of discharge from the Skyline ditch were in error, but inasmuch as the Water Supply & Storage Co. was entitled to divert from the Poudre River an amount equivalent to that discharged into the Poudre River from the Laramie, no effort to verify the Laramie measurements were made. This Honorable Court gave due consideration to this evidence in determining the relative rights of these states in the waters of the Laramie River in the former Wyoming-Colorado case. (See Opinion, Vol. 66 L. Ed. U. S. Reports, Page 1016; 259 U. S. Reports, Page 471).

COLORADO'S VESTED RIGHTS

Colorado states that the decree in the former Wyoming-Colorado case does not include and control the rights of all appropriators of water from the Laramie River in Colorado under the laws of Colorado, because such rights are in the nature of vested property rights.

The Constitution of the State of Colorado, as construed by the Supreme Court of that state, provides that waters of Colorado belong to the State in its sovereign capacity, and the State grants to the appropriators of its water the right to its use, and nothing more.

No. 7, Original, Wyoming vs. Colorado, Brief of Defendants, Page 121:

"The defendants feel that priority of right as between users in different states has no place in a suit between sovereign states affecting the water of interstate streams, except possibly, that the relative priorities might be one of many factors from which the court would determine the reasonableness of the use in one state as against another, or, in other words, might be one factor in determining the equities between the states."

No. 5, Original, Wyoming vs. Colorado, Brief in answer to brief of the United States, Page 43:

"* * * In Colorado, and we think the same is true of all the arid States, the individual appropriator is but a cog in the machinery or process of irrigation development. He has no independent exclusive right to water, to do with it as he likes, as he may with all other forms of property. On the contrary, he is deemed to be using a public fund, and he must use it to the satisfaction of the public, and he is not left to determine that matter for himself. The State, in the person of its water officials, superintends his taking of water and must be daily satisfied that it is then necessary to his use. If he ceases to use it for an unreasonable time, his right ceases and the water returns to the common fund. He is never free from an obligation to the State and its citizens, as well as to those who are making a like use of the public waters. * * *"

Section 5, Article XVI, Constitution of Colorado, is as follows:

"The water of every natural stream, not heretofore appropriated, within the State of Colorado, is hereby declared to be the property of the public, and the same is dedicated to the use of the people of the state, subject to appropriation as hereinafter provided."

This provision of the Constitution has been construed a number of times by the Supreme Court of Colorado. One of the late cases so construing it, being a controversy over the rights to the use of the waters of a natural stream in Colorado, is Bowers v. McFadzean, 82 Colo. 138. At Page 142, the Court says:

"* * * Curby's (through whom one of the parties claimed his right) title or right to the use of water of the natural streams in the State of Colorado, did not come from the United States, but from the State of Colorado which is the owner in its sovereign capacity of the waters of all of its natural streams, and it is only the right to the use of the water that it permits appropriators to acquire. The ownership of the water itself of all our natural streams still is in the State of Colorado. * * *"

And Colorado acknowledges that her ownership and control of the waters of this interstate stream within the state is subject to the jurisdiction of this Honorable Court:

Wyoming vs. Colorado, et al, supra.
Colorado vs. Kansas, Bill of Complaint, Page 9, Paragraph 5; Pages 42 and 43, Paragraph 17; Reply of Colorado, Page 15.
Missouri vs. Illinois, supra.
Kansas vs. Colorado, supra.
Georgia vs. Tennessee, supra.

The last three authorities are cited by Colorado on the question of ownership and control of interstate streams by sovereign states.

(See Colorado brief, Vol. 1, Page 132, former Wyoming-Colorado case).

That in determining the relative rights of contending states to the use of the water of an interstate stream, this Honorable Court does not recognize so-called vested rights of the state appropriators is held in the case of Connecticut vs. Commonwealth of Massachusetts, decided February 24th, 1931, wherein it is said:

"But the laws in respect of riparian rights that happen to be effective for the time being in both States do not necessarily constitute a dependable guide or just basis for the decision of controversies such as that here presented. The rules of the common law on that subject do not obtain in all the States of the Union, and there are variations in their application. The doctrine of appro-

priation prevails in some States. And every State is free to change its laws governing riparian ownership and to permit the appropriation of flowing waters for such purposes as it may deem wise. United States v. Rio Grande Irrig. Co., 174 U. S. 690, 702, 43 L. Ed. 1136, 1141, 19 S. Ct. 770.

"For the decision of suits between States, federal, state and international law is considered and applied by this court as the exigencies of the particular case may require. The determination of the relative rights of contending States in respect of the use of streams flowing through them does not depend upon the same considerations and is not governed by the same rules of law that are applied in such States for the solution of similar questions of private right. Kansas v. Colorado, 185 U. S. 125, 146, 46 L. Ed. 838, 846, 22 S. Ct. 552. And, while the municipal law relating to like questions between individuals is to be taken into account, it is not to be deemed to have controlling weight. As was shown in Kansas v. Colorado, 206 U. S. 46, 100, 51 L. Ed. 956, 975, 27 S. Ct. 655, such disputes are to be settled on the basis of equality of right. But this is not to say that there must be an equal division of the waters of an interstate stream among the States through which it flows. It means that the principles of right and equity shall be applied having regard to the 'equal level or plan on which all the States stand, in point of power and right, under our constitutional system,' and that, upon a consideration of the pertinent laws of the contending States and all other relevant facts, this court will determine what is an equitable apportionment of the use of such waters. Wyoming vs. Colorado, 259 U. S. 419, 465, 470, 66 L. Ed. 999, 1013, 1015, 42 S. Ct. 552."

COLORADO DENIES EXISTENCE OF VESTED RIGHTS IN INDIVIDUAL WATER USERS UNDER LAWS OF COLORADO

In the case of The La Plata River and Cherry Creek Ditch Company v. M. C. Hinderlider, as State Engineer of the State of Colorado, et al., supra, the plaintiff is prosecuting an ac-

tion to enjoin the State Engineer of Colorado and other named state water officials of the State of Colorado from interfering with its alleged vested rights acquired by reason of an adjudicated decree from a court in the State of Colorado, having jurisdiction to issue an adjudicated Water Right Decree. The defendant officers, through the Attorney General of the State of Colorado, deny the existence of the alleged vested rights in the plaintiff, and we quote as follows from the brief of the Attorney General of Colorado in support of the action of said water officials and in denial of the alleged vested rights of the plaintiff:

Pages 2 and 3:

"Plaintiff in error, The La Plata River and Cherry Creek Ditch Company, a mutual ditch company organized as a Colorado corporation, diverted water from La Plata River and applied it to a beneficial use for irrigation purposes upon a mesa known as Thompson's Park in southwestern Colorado, and thereafter received a decree therefor from the La Plata County District Court.

"La Plata River is a tributary of the San Juan. It rises in La Plata mountains and flows thence south into New Mexico to join the San Juan a short distance west of Farmington. It waters lands in both states. Irrigation was developed in New Mexico during the time when most of the arable lands in La Plata drainage in Colorado were included within the Ute Indian Reservation, and were not open to development.

"Subsequently, the Indian Reservation was opened to settlement and numerous canals were constructed in Colorado, and the diversion of water through their headgates caused friction between appropriators in the two states and later between the states.

"When a question arose as to the division of the flow of the river because of the claims of individual water users on opposite sides of the interstate line, the states, as the representatives of their citizens, assumed the settlement of the problem and by proper legislative action provided for the appointment of commissioners to equitably apportion the waters between the contracting states. The legislatures of the two states approved the agree-

ment as drafted by their commissioners, and the Congress of the United States thereafter ratified it on January 29, 1925.

* * *

"By the compact each state is allowed a definite share of the river flow under the varying conditions which obtain during the irrigation season. Under paragraph 3 of Article 2, however, it is provided, that, if in the opinion of the State Engineers it will be to the best interests of the contracting states, the stream flow may be rotated between the two states under conditions to be fixed by them.

"Since its approval by Congress, the waters of the river have been divided and distributed between the states in conformity with the Compact, the water officials in each state distributing its share among the appropriators according to local laws and court decrees.

"In making interstate divisions during the hot summer months when the river supply is very low, the State Engineers of Colorado and New Mexico have rotated the available supply pursuant to this provision. The water has been shut off from the ditches in each state in alternating periods of time, and plaintiff particularly complains of being deprived of its water supply when the total flow is passing to New Mexico under the rotation arrangement.

"In June, 1928 when the headgates in Colorado were closed to permit the entire flow to go down stream to New Mexico under a rotation agreement, the Ditch Company commenced this action against the State Engineer and his subordinates. It was alleged that they were taking plaintiff's water and delivering it to others contrary to the decreed rights on the river and because of the injury resulting therefrom a bad for an injunction."

Page 6:

"The defendants admitted the closing of the headgate, alleged the Compact to be the law of the river and sought to justify their conduct under its terms. They denied however, that they had ever distributed water among the water users in this state except in strict conformity with the decrees of court."

Colorado in the case at bar denies that the decree of this Honorable Court is the law of the Laramie River, although she pleads the New Mexico-Colorado Compact as justification for her acts and conduct on the La Plata River.

Pages 6 and 7:

"THE ISSUE

"This put the validity of the compact directly in issue and the interesting question was raised as to the powers of the states, in matters involving their rights and those of their citizens, to assume the business of making a settlement.

"When sovereign entities disagree the ultimate settlement is by a resort to arms.

"But by the adoption of the Constitution and by their consequent relinquishment of certain of their attributes of sovereignty, all of the original thirteen states, and, of necessity, every state thereafter admitted into the Union, surrendered the right to wage war.

"There were left, then, two methods for settling the question. The first was by an original suit before the Supreme Court of the United States with the two states aligned on opposite sides as parties, and the second by a compact between the States.

"In many instances states have gone into that court for the settlement of disputes. The cases of Kansas v. Colorado, and Wyoming v. Colorado, and the pending case of Colorado v. Kansas furnish the outstanding examples of the application of the first method in the solution of problems involving irrigation streams."

CONTROVERSY OVER USE OF WATERS OF INTERSTATE STREAMS CANNOT BE SETTLED BY INDIVIDUALS

Pages 8 and 9:

"This controversy over the opposing claims of water users along La Plata on either side of the state line could not be settled by the individuals involved. And the states,

in the roles of *parentes patriae*, were called upon to employ one of the two methods left available for the solution of the problem. The legislatures of the two states determined to exercise the treaty-making power and Commissioners were appointed to treat.

"The defense is based squarely upon the terms of that compact. If the states had no power to treat, or if the agreement, when approved and ratified, could not, and did not, bind the rights of the citizens of the two states, then the defense must fail."

Pages 10 and 11:

"In concluding interstate river compacts the states proceed upon this fundamental basis of state ownership of the waters under consideration and upon the principles that each appropriator and user of water within the state obtains his right of use from the state in which the diversion and use occur; that each state upon an interstate stream possesses and exercises its sovereignty over an equitable portion of the waters of that stream; that such portion is undetermined until fixed by interstate compact or by decisions of the Supreme Court of the United States; that each appropriator initiates and perfects his usufructuary rights, with full knowledge and notice of the interstate character of the stream and of the limitations upon the rights of his state; that determination of the rights of his state determines his rights, and that he must look for his supply from the portion determined to be subject to the sovereignty and control of his state."

Page 11:

"Further, that the rights of the appropriator vest subject to such interstate determination (past or future). And this determination, when made, relates back to the beginning of statehood and is presumed to have existed since the birth of the nation. This principle is analogous to that applied in boundary cases."

Pages 11 and 12:

> "* * * Each state is the source of title in respect of the rights of its several appropriators of waters of the river, and each state did not and could not grant any greater title than it had to convey. The rights of each appropriator vested with full knowledge and notice that his rights were subject to future definition of the equitable sovereignty of his state and would be bound by and subject to such determination, whether by interstate agreement or by decisions of the Supreme Court sitting in original jurisdiction in a case between Colorado and New Mexico."

The controversy in the case at bar would be quickly disposed of, if Colorado would apply the same reasoning as is set forth in the last above quotation.

On the Laramie River, as on the La Plata River, the rights of each appropriator vested with full knowledge and notice that his rights were subject to future determination of the equitable rights of his sovereign state and would be subject to such determination, whether by interstate agreement or by decisions of this Honorable Court, sitting in original jurisdiction in a case between Wyoming and Colorado.

Page 12:

> "Determination was affected by compact and the equitable apportionment thereby made, whether by division of daily flow or by rotation of use of the entire flow in alternating periods between the signatory states, is binding and obligatory upon each state and all its appropriators of waters of the river. The compact may be enforced by original interstate suit in the Supreme Court, and rights which have vested under its provisions are obligations protected by the Constitution.
>
> "It is defendants' theory, then, that the state acted within its powers in defining the limits of the interests of the two states on La Plata, that the plaintiff is bound thereby and that no vested right has been taken because the water in controversy belongs to New Mexico. Colorado's water administration officials are carrying out the law of the river and no injunction will lie."

Page 24:

"Now the Ditch Company asks: How can the state, after issuing a decree therefor, deprive plaintiff of its vested right to irrigation water?

"This is the real question in the case. Upon its analysis and solution depend the rights of the parties here.

"Admittedly there are no cases involving irrigation water rights to which we may turn for the answer but the determining principles have been considered by the United States Supreme Court on several occasions and their application to this situation is clear."

Page 26:

"This put the compact powers of the state directly in issue. The result is a series of judicial pronouncements by the United States Supreme Court which we claim are controlling in the case at bar. The outstanding cases are Poole v. Fleeger, 11 Pet. 185 and Coffee v. Groover, 123 U. S. 1, and we point to them as determinative."

Complainant contends that the cases last above cited from Colorado's Attorney General's brief in the La Plata case, supra, as effectively support Wyoming's position in the case at bar, to the effect that Colorado individual appropriators on the Laramie have no vested rights except as modified by the limits of the title of the State of Colorado in this interstate stream, as do also the following:

Pages 39, 40 and 41:

"TITLE OF THE STATE

"Basing his contentions upon the two propositions, that an appropriator of irrigation water derives his title from the United States, and that the state parted with whatever interest it may have owned therein when its court decreed the water right to the plaintiff, counsel would confine the effect of the Colorado-New Mexico Compact to the unappropriated waters of La Plata River and deny to the states the right to deal with all the waters of the

stream as a whole, so as to bind the owners of decreed water rights.

"To meet this argument, it becomes necessary, not only to investigate the origin of interstate compacts and to trace the history of their exercise since the adoption of the Constitution, but, also, to analyze the source and character of the right to divert water for irrigation purposes in Colorado.

"It would seem that the question of the ownership of the waters of the natural streams in Colorado should be foreclosed in Colorado's courts, but, because of the manner in which the question has been raised here, it is probably not out of place to suggest the line of authority which supports the state's claim to the ultimate title in the water.

"The original appropriation of water upon which plaintiff's decree is based was dated June 2, 1890, and so was subsequent, in time, to the admission of Colorado into the Union, and consequently the water was unappropriated at the time of the adoption of the State Constitution in 1876.

"In other words, the water in controversy here was of the character defined in that clause which declared that the water of every natural stream, not theretofore appropriated, was the property of the public and expressly dedicated it to the use of the people.

> " 'The water of every natural stream, not heretofore appropriated, within the state of Colorado, is hereby declared to be the property of the public, and the same is dedicated to the use of the people of the state, subject to appropriation as hereinafter provided.'
>
> Article XVI, Sec. 5, Colorado Constitution."

Pages 45 and 46:

"Our Constitution dedicates all unappropriated water in the natural streams of the state 'to the use of the people,' the ownership thereof being vested in 'the public.'

Wheeler v. Northern Colo. Irrigating Co., 10 Colo. 582, 587, 17 Pac. 487.

"Under our Constitution the water of every natural stream in this state is deemed to be the property of the public. Private ownership of water in the natural streams is not recognized. The right to divert water therefrom, and apply the same to beneficial uses, is, however, expressly guaranteed.

Fort Morgan Land & Canal Co. v. South Platte Ditch Co., 18 Colo. 12, 30 Pac. 1032.

Coffin v. Left Hand Ditch Co., 6 Colo. 443.

Hammond v. Rose, 11 Colo. 5241, 19 Pac. 466.

Beaver Brook Co. v. St. Vrain Co., 6 App. 130, 40 Pac. 1066."

Pages 52, 53 and 54:

"COLORADO MAY NOT TAKE ANOTHER'S WATER

"The chief concern is to determine the exact nature of the title which the plaintiff in error acquired when it diverted water from La Plata River for irrigation purposes.

"Because this Court has defined the right which an appropriator of water acquires as a vested interest, counsel for plaintiff maintains that such title is absolute. In testing this position the exact character of title which the water user's predecessor possessed becomes important.

"If, as defendants contend, the interest of the appropriator was acquired under the provisions of the Colorado Constitution, and was defined by the terms of a decree of a court which functioned by virtue of that same instrument and the statutes passed in conformity therewith, then the extent of the title which Colorado, itself, possessed in the waters of this interstate stream in the first place, and which passed in part to the plaintiff in error under its water decree furnishes the guide for determining this question.

"It is the position of defendants that Colorado, by reason of its sovereignty, is the owner of the waters of its non-navigable streams, subject only to an interest existing in favor of adjoining states upon such streams as

cross state lines. Therefore, the water used by the plaintiff company has always been and now is the property of the State. And whatever right or title accrued to plaintiff was acquired from the State of Colorado, whether claimed by reason of its appropriation and application to a beneficial use, only, or under the decree from the La Plata County District Court.

"To sustain the contention of plaintiff that a Colorado water user acquires an absolute title, one must carry the reasoning to its ultimate conclusion, and assert that Colorado owns all the water of its interstate streams or else that its court decrees had the effect of confirming an absolute title to the entire river flow in defining the rights acquired from the Federal government.

"No state may claim the ownership of all the waters of a stream which crosses its borders into or from a sister state however. The United States Supreme Court made this clear on two different occasions when Colorado asserted the right to take all of the waters of the Arkansas and the Laramie Rivers, if the needs of its citizens demanded. And in a case decided on May 4 of this year, Mr. Justice Holmes referred to the decisions in those two cases in defining the limits of the rights of the states of New York, New Jersey and Pennsylvania on the Delaware River. The rule announced in the Kansas case and followed consistently thereafter is that each state possesses and exercises an equitable sovereignty over the waters of an interstate stream which must be recognized and respected by everybody.

"From this it follows that New Mexico, by reason of its sovereignty, now owns, and has always owned, an equitable interest in the waters of La Plata River which limits and defines the rights of Colorado and its citizens therein. And by the same token, Colorado exercises sovereignty over an equitable portion of that stream which limits and defines the rights of the lower state and its citizens."

Pages 88 and 89:

"STATE'S RIGHT SUPERIOR TO INDIVIDUAL

"The principles urged by plaintiff would make the jurisdiction of the State of Colorado inferior and subservient to superior and dominant claims of each and every appropriator and user of water in the state.

"These alleged rights of individuals are said to have vested under Acts of Congress, the supreme law of the land, and to be largely immune from state jurisdiction.

"Such a theory is not in accord with the principles under which Colorado's water system has been built up and is directly contrary to its statutes, court decisions and customs and has no support from the Federal enactments and decisions.

"QUESTION IS ONE OF STATE AND NOT OF INDIVIDUAL RIGHTS

"Plaintiff says that the rights of New Mexico and its citizens may not be considered here since they are not parties to the record; nor will defendants be relieved from the consequences of their actions in closing plaintiff's headgate merely by showing that certain absentees had an interest in the water which may have been superior to that of the plaintiff.

"Our answer is that, when a citizen of one state claims the water of a citizen of another state it ceases to be a controversy between individuals and becomes a question between the states.

"And when, as in this case, the extent of their interests has already been determined between the states in their sovereign capacities, it is unnecessary to again call in New Mexico in order to settle a question arising out of the claim of a Colorado citizen in a suit to force a state official to do something which would violate that agreement.

"Poole v. Fleeger, supra—Opinion by Baldwin, J.—211."

Page 96:

"DECREE HAS NO EXTRA-TERRITORIAL EFFECT

"If, as defendants claim, Colorado never possessed any interest in the water of La Plata beyond that which the compact defines, then its courts had no jurisdiction over that portion of the flow, which by the terms of the compact is declared to belong to New Mexico.

"To attempt to assert any such authority would be to say that the laws and courts of Colorado possess extra-territorial qualities and powers. But the rights of water users which are based upon a decree from a Colorado court are necessarily limited and determined by the jurisdiction of that court and the extent of the subject matter with which the court was dealing.

"As said by Mr. Justice Brewer in Kansas v. Colorado, supra, each state has full jurisdiction over the beds of streams and other waters within its borders but it can impose its own legislation on none of the others and is bound to yield its own views to none. This very inability of any state to extend its powers beyond its borders requires the inter-position of the Supreme Court in case where the states do not settle their rights by treaty."

Pages 100 and 101:

"SOURCE OF PLAINTIFF'S TITLE RELATIVELY UNIMPORTANT

"Our contention is that, whether the title of the water user is deraigned from the state or from the United States through the intermediate agency or channel of state law, the effect is the same—the title of the appropriator is no better in one case than in the other.

"If deraigned directly from his state, his title is always subject to interstate determination, either by an interstate compact or, by decision of the Supreme Court of the United States in original proceedings between the states.

"If deraigned from the United States through the medium of state law, the laws of the state and the limits of its jurisdiction are impressed upon the title of the appropriator. In either case he takes subject to the limitations upon the title of the state, *and as grantee* (using the term qualifiedly)—can receive no greater title than his grantor had to convey.

"The deraigning of title from the United States would give him no preferential status for the reason that by the Acts of 1866 and other Congressional enactments, the title would be made to rest according to the customs, laws and decisions of the courts of the several states and territories.

"While he might maintain that those acts were merely confirmatory of the jurisdiction of the states which already existed (See Kansas v. Colorado, Gutierres v. Albuquerque, U. S. v. Rio Grande Irr. Co., all supra), nevertheless, if it be said that these newer states were not equal in all respects with the original thirteen states, and that the United States retained a perpetual and dominant control over every stream within their borders—both navigable and non-navigable—even under such a narrow construction, the Acts of 1866 and those which followed, make the title of the appropriator filter through and partake of the infirmities of state laws and jurisdictions.

"The claim, then, that Colorado, by administering the La Plata River according to the terms of the compact is divesting plaintiff of a vested right answers itself. Even if we concede that the rights in question had vested as far as Colorado and its citizens are concerned, nevertheless the title of the plaintiff must give way before the requirements of the compact since the water which it claims has always belonged to New Mexico."

Pages 154 and 155:

"MISCELLANEOUS

"Let us consider what would have happened if the states had not caused the flow of La Plata to be equitably apportioned by a compact. When Colorado citizens con-

tinued to divert the flow of the stream to the injury of its citizens, New Mexico would have gone into the United States Supreme Court and commenced an original suit.

"Assuming that the Supreme Court had entered a decree *embodying substantially the* terms of the compact, would Colorado or its citizens be heard to object if a court official, acting under the decree, were to close the headgates in Colorado for ten days so as to permit all the water to be used in New Mexico in harmony with a finding that such a plan of rotation was proper and equitable?

"The question answers itself. The two states and their officials would be bound to obey the decree of that court. • • •"

Complainant has quoted at length from the bill of complaint and reply of Colorado as filed in the pending case of Colorado v. Kansas, et al., and from the brief of the Attorney General of the State of Colorado in the La Plata River case, pending in the Supreme Court of the State of Colorado, for the reason that the position of the defendant in the case at bar seems conclusively impeached by her position in each of these controversies. Supplementing Colorado's positions, as there reflected, by her plea and argument in the petition for a re-hearing in the former Wyoming-Colorado case, supra, would seem sufficient to make Colorado refrain from attempting, under the contention for vested rights and lack of jurisdiction, to justify her admitted taking of that portion of the water of the Laramie River which this Honorable Court determined belonged to the State of Wyoming.

Defendant declares, at Page 52 of her brief in the La Plata case, supra, that COLORADO MAY NOT TAKE ANOTHER'S WATER, and in her brief in the case at bar, she asserts that the action of individual citizens who were not named defendants in the said former Wyoming-Colorado case, are beyond the reach of the jurisdiction of this Court.

In the La Plata case, the controversy involved the scope and validity of an interstate compact; in the case at bar, the enforcement of a decree of this Honorable Court is involved.

Colorado says, at pages 154 and 155 of the Attorney General's brief in the La Plata case:

"Assuming that the Supreme Court had entered a decree embodying substantially the terms of the compact, would Colorado or its citizens be heard to object, if a court official, acting under the decree, were to close the headgates in Colorado for ten days so as to permit all the water to be used in New Mexico in harmony with a finding that such a plan of rotation was proper and equitable?

"The question answers itself. The two states and their officials would be bound to obey the decree of that court. • • •"

In the case at bar, we do not have to assume that a decree was entered. Colorado, notwithstanding the entry thereof in effect says that her citizens do not have to obey such decree, but can continue to take the water that belongs to the State of Wyoming. While she argues that her citizens may not take the water that was determined by compact to belong to New Mexico, Colorado attempts to distinguish between the solemnity of the La Plata Compact on the one hand, and the decree of this Honorable Court on the other, and thereby justify her position in the case at bar.

In complainant's second cause of action, she petitions this Honorable Court that an adequate method for the correct measurement of water diverted from the Laramie River into the Poudre River be installed and maintained, to the end that no further illegal and/or excess diversions be accomplished. Defendant, Page 21 of brief, in support of her motion to dismiss, states that this is not an independent cause of action, but presents merely an aspect of the remedy sought; that it must stand or fall with the principal issue.

The allegations of the bill as to excess diversions, are criticized as being insufficient to warrant the attention of this Honorable Court, stating that if Wyoming is not right in her contention as now made, little difficulty would be experienced in the measurement of the flow through the tunnel.

Paragraph Nine of the bill alleges that Colorado, through her officials, has failed to keep accurate records from which it can be determined what the actual diversion for any one year has been from the Laramie River to the Poudre River, and that unreported quantities of water have been, by the officials of defendant, permitted to be diverted through the tunnel.

At Page Five of Colorado's brief, counsel comment that in the event of discrepancy as to the amount of water diverted from the Laramie River into the Poudre River, it is because the Division Engineer has control over the Water Commissioner, and that the duty is cast upon the Water Commissioner of the District to keep a record of the amount of water turned into his district from any other district (citing Section 1704, C. L. 1921). This section is as follows:

> "It shall be the duty of the water commissioner of the district in which the water is used to keep a record of the amount of water so turned into his district from any other district."

Also, in support of the contention that the report of the Division Engineer should be accepted over that of the Water Commissoiner, Defendant cites Section 1838, C. L. 1921. This statute provides:

> "All water commissioners shall make reports to the superintendent of irrigation of their division as often as may be deemed necessary by said superintendent. * * *" (Remark—the Division Engineer has replaced the Superintendent of Irrigation.)

The Division Engineer has construed the above provision of said Section 1838 as discretionary only, stating that the Water Commissioner of District No. 3, which receives the diversions from the Laramie River in District No. 48, is not required by law to make any report to the Division Engineer; and inasmuch as defendant seeks to characterize the allegation of the bill relating to the necessity for an accurate measurement as unreliable, we feel justified in commenting that, notwithstanding the provisions of said Section 1838, C. L. 1921, commanding the Division Engineer to carefully file and preserve such reports, the complainant, in her search for these records as to trans-mountain diversions, including the tunnel, was advised by a Colorado official in charge of the administration of water received from the Laramie River diversions, that all records relating to such trans-mountain diversions for years prior to 1926 had been destroyed. And we call attention to the Twenty-fifth Biennial Report of the

State Engineer of Colorado for the years 1929-1930, at Page 290, from which we quote:

> "All annual reports from the Water Commissioners, with the exception of Districts 23 and 48, have been received. The Commissioner of District No. 48, which comprises North Park, is rarely called, so that the data for the preparation of an annual report is not available."

In commenting upon the above quotation, we may state that District No. 48 does not comprise North Park, as there stated, but is the district in which diversions from the Laramie to the Poudre are effected.

In view of the fact that the Division Engineer has construed the Statute relating to reports from the Water Commisisoner to the Division Engineer as purely discretionary, and because the report of the Commissioner as to diversions from District No. 48 are rarely called for, we submit that Wyoming should be permitted to install its own measuring devises, or that the same be placed under the control of a Federal agent.

Paragraph 13 of the bill alleges a flagrant disregard of the terms of the decree as to diversions for irrigation of the meadow lands in Colorado, and as to these allegations, defendant makes no comment. As to the allegations of Paragraphs 11 to 15, relating to excessive or unlawful diversions, the allegations are met by an assertion that such diversions do not violate the terms of the decree in the former Wyoming-Colorado suit.

In Paragraph 2 of the second cause of action, complainant alleges that permission to Wyoming to measure the diversions from the Laramie River in District No. 48 to the Poudre River in District No. 3, was denied. Defendant does not attempt to refute this allegation and disposes of same by the comments found on Page 11 of her brief, to the effect that Wyoming would not accomplish anything further than furnish the means of creating disputes between the measurements taken by the agents of Wyoming when compared to the measurements taken by Colorado agents, with no method of adjusting such differences. The possibility of creating such a situation would seem to justify the request of Wyoming that the duty of meas-

uring said diversions be entrusted to an impartial and independent agency.

CONCLUSION

Colorado states, Page 20 of her brief, that if Wyoming's position with reference to the construction of the former decree is correct, that conclusion would practically dispose of the case, admitting that more than 18,000 acre-feet annually have at times been diverted through the Skyline Ditch. It is a legitimate assumption that if Wyoming's position as to the relative rights of the two contending states in the use of the waters of this interstate stream be correct, there would be nothing further for the consideration of the Court, especially if future regulation of diversions be placed under an impartial agency.

The position advanced by defendant in her motion to dismiss the bill of complaint has placed the case before the Court in a manner which will enable it to make a final disposition of the same upon the consideration of the motion. It will be unnecessary to require further evidence than the admissions of defendant, as Wyoming is not seeking an award of damages but desires that defendant Colorado be prevented in the future, from taking from the Laramie River any of that portion of the stream flow which this Honorable Court determined was Wyoming's equitable portion.

There is no failure on the part of Colorado to fully understand the full import of the decree determining the relative rights of Wyoming and Colorado in the use of the waters of the Laramie River, and the purpose of the present suit is to prevent further violations thereof by Colorado, acting through her officials, agents and citizens, by and with the consent of the State of Colorado.

The quotation from the brief of the Attorney General of Colorado in the case of The La Plata River and Cherry Creek Ditch Company v. M. C. Hinderlider, et al., supra, Page 155, states most forcefully and clearly why Wyoming has filed her bill of complaint in the case at bar, and answers the question presented to this Honorable Court in the way Wyoming contends it should be answered:

"THE TWO STATES AND THEIR OFFICIALS WOULD BE BOUND TO OBEY THE DECREE OF THAT COURT."

Complainant respectfully submits that the motion of the defendant is without merit and should be denied. That by reason of the definite admissions in the brief of defendant of the truth of the allegation of plaintiff's bill of complaint to the effect that defendant has through her officials, permitted the taking of water from the Laramie River and its diversion therefrom into the Poudre River in annual quantities in excess of the equitable portion allotted to Colorado under the decree in the former Wyoming-Colorado case, supra, the Court make final disposition of this case upon consideration of defendant's motion. Colorado so states on Page 20 of her brief in support of the motion to dismiss.

RESPECTFULLY SUBMITTED,

.....

JAMES A. GREENWOOD,
Attorney General of the State of Wyoming.

.....

RICHARD J. JACKSON,
Deputy Attorney General of the State of Wyoming.

.....

PHILIP S. GARBUTT,
Assistant Attorney General of the State of Wyoming.

.....

GEORGE W. FERGUSON,
Assistant Attorney General of the State of Wyoming.

ATTORNEYS FOR COMPLAINANT, STATE OF WYOMING.

FILE COPY

In the
Supreme Court of the United States
In Equity

OCTOBER TERM, 1932

No. 15, Original 10

THE STATE OF WYOMING, *Complainant*,

vs.

THE STATE OF COLORADO, *Defendant*

ANSWER OF THE STATE OF COLORADO TO THE AMENDED ORIGINAL BILL OF COMPLAINT

CLARENCE L. IRELAND,
Attorney General of the State of Colorado.

GEORGE A. CROWDER,
Deputy Attorney General.

E. J. PLUNKETT,
Assistant Attorney General.

PAUL W. LEE,
Special Counsel.

Solicitors for Defendant.

THE SMITH-BROOKS PTG. CO., DENVER

In the
Supreme Court of the United States
In Equity

OCTOBER TERM, 1932

No. 15, Original

THE STATE OF WYOMING,
Complainant,
vs.
THE STATE OF COLORADO,
Defendant.

ANSWER OF THE STATE OF COLORADO TO THE AMENDED ORIGINAL BILL OF COMPLAINT

Comes now the State of Colorado, by Clarence L. Ireland as Attorney General of the State, and for answer to the amended original bill of complaint of complainant, the State of Wyoming:

FIRST: It admits the allegations of the First, Second, Third, Fourth, Fifth, Sixth and Seventh numbered paragraphs of said complaint.

SECOND: Answering the "Eighth" numbered paragraph, it denies that the gauging and measuring devices installed by this defendant do not accurately gauge and measure the full amount of water diverted by means of and

through the designated lawful diversions as defined in the said decree of this Honorable Court; and alleges that all of such measuring equipment is standard and adequate for making proper measurements; and defendant is ready and willing to permit the complainant and its accredited officials to check all of such equipment; and the defendant is also ready and willing to make, or cause to be made, any proper improvements in such measuring devices or methods of measurement to the reasonable satisfaction of the plaintiff, and will furnish to the plaintiff a reproduction record of gauge heights and daily diversions and all information necessary to enable plaintiff accurately to check and verify the same.

THIRD: It denies that it has permitted water to be diverted from the Laramie River and/or its tributaries by means of and through the Laramie-Poudre tunnel diversion in excess of 15,500 acre-feet per annum; it denies that during the year 1926, there were diversions through said tunnel of 13,572 acre-feet; it denies that diversions in such quantities were shown by the official records of Colorado. As to the allegation of said "Ninth" numbered paragraph concerning unreported diversions through said tunnel in the amount of over 3,000 acre-feet, defendant alleges that, during the year 1926, the "Skyline Ditch" (the ditch referred to in the former decree of this Court) broke and remained for some time in a state of disrepair, incapable of carrying the water to which the owner of said ditch was entitled, and thereupon, by arrangement between such owner and the owner of the Laramie-Poudre tunnel, the water to which the Skyline Ditch was entitled was carried through and by means of the Laramie-Poudre tunnel, to the extent of approximately 583 acre-feet.

Admits that the records of the Division Engineer certified to by him show a diversion of 5,644 acre-feet through the tunnel, and alleges that the diversion through said tunnel in said year was 5,644 acre-feet and no more, being

5,061 acre-feet on account of the tunnel appropriation and 583 acre-feet on account of the Skyline appropriation.

FOURTH: Answering the "Tenth" numbered paragraph of the complaint, the defendant admits that, as set forth in said decree, the State of Wyoming was found to be entitled to water from the Laramie River for the purpose of irrigating lands in said state in excess of the amount of water to which the State of Colorado was found to be entitled for irrigating lands in Colorado, but for its exact provisions defendant refers to said decree; admits that the State of Wyoming has an interest in the appropriation, diversion and measurement of the waters of the Laramie River and its tributaries in Colorado. Answering the charge that defendant, although requested in writing for permission to install its own standard gauging devices and make its own measurements of diversion of water from said Laramie River and its tributaries in Colorado, denied such request, defendant alleges that the State Engineer of Colorado, the official in general charge of supervision of irrigation in the state, invited the officials of Wyoming to check all measuring equipment installed for making proper measurements, together with all data obtained by Colorado officials in connection with the same, and then offered to make any proper improvements in devices or methods of measurement, as suggested by plaintiff, but said offer was thereupon declined, and it was then demanded in behalf of Wyoming that all such measurements and equipment be placed under the supervision of a representative of the United States Geological Survey, which demand was denied for the reason that the State Engineer could not agree conformably with the duties of his office to surrender the control which the statutes of the state impose upon him; and hereunder the State of Colorado avers that the transmountain diversions from the Laramie River for carriage of water in the Cache la Poudre River vitally affect and concern all existing water rights in said Cache la Poudre River in Colorado.

The defendant is ready and willing now, and for the future, to permit access to all of such measuring devices, and to cooperate with the officials of the plaintiff, to the end of assuring at all times accurate measurements of all transmountain diversions made of the waters of the Laramie River in Colorado. Defendant alleges that all of the devices in use and all of the measurements made in the past are standard, proper and accurate, to the best of defendant's knowledge, information and belief; and defendant further alleges that, for the past four years the State of Wyoming has actually been making its own measurements and consulting the records of measurements made by its own officials and by the Colorado water officials as to the transmountain diversions from the Laramie River in Colorado.

FIFTH: For answer to the "Eleventh" numbered paragraph of said complaint, the defendant disclaims and denies any intent on its part to violate or to disregard the said decree and the terms thereof, or the injunction therein contained against the alleged excessive or otherwise unlawful diversions of water therein referred to; and hereunder alleges that the Attorney General of the State of Colorado and the officials charged with the supervision and control of water diversions in the State of Colorado, in administering and controlling such diversions from the Laramie River, have in good faith considered and believed that the proviso incorporated in the decree of this Court that the same should not prejudice the right of the State of Colorado to continue to exercise the right existing thereby recognized to divert and take from such stream and its tributaries certain quanitites of water under certain appropriations theretofore made, did not operate as a limitation upon the enjoyment of such appropriations perfected in the state prior to the entry of the said decree to the extent of their beneficial use as enjoyed prior to the entry of the said decree.

SIXTH: It admits that there was diverted through and by means of the Skyline Ditch, as alleged in the "Twelfth"

numbered paragraph of the complaint, 22,150 acre-feet of water in the year 1927, and 19,397 acre-feet of water in the year 1928. It denies that 24,363 acre-feet of water was diverted in the year 1929, and alleges that in said year 23,686 acre-feet and no more was so diverted.

In connection with this admission, the defendant alleges that, during none of the said years was there a total diversion from the Laramie River and its tributaries in Colorado in excess of the total of 15,500 acre-feet in connection with the Laramie-Poudre tunnel appropriation, and 18,000 acre-feet in respect of the Skyline Ditch appropriation, and 4,250 acre-feet in virtue of and through the meadowland appropriation in that state, together with the relatively small amount of water appropriated from the headwaters of Deadman Creek by and through what is designated as the Wilson Supply Ditch, save only in the year 1929, in which year as appears by the records 23,686 acre-feet was diverted by the Skyline Ditch, 8,916 acre-feet by and through the Tunnel appropriation, 600 acre-feet by means of the Columbine Ditch, and 1,140 acre-feet by means of Bob Creek Ditch, in addition to the diversions by the "meadow" appropriators and by the Wilson Supply Ditch. For the years 1927 and 1928 a quantity of water substantially less than 37,750 acre-feet, in addition to the water appropriated by means of the Wilson Supply Ditch was so diverted.

Defendant alleges that, according to its understanding of the force and effect of the decree of this Court, the plaintiff is without just or legal ground for complaint with respect to such diversions, so long as the total of diversions permitted in Colorado is not exceeded; and that such permitted total of diversions was awarded or recognized in Colorado as a unit, and that such total quantity is and of right should be administered and allowed to be diverted by the several appropriators thereof as their several rights *inter se* appear, and that this Court has not undertaken to allocate fixed quantities severally to the individual consum-

ers, and all matters in controversy between said several consumers are for determination in the courts of the defendant unprejudiced by the determination of this court other than its limitation to a permitted maximum of the total of such diversions.

SEVENTH: Answering the "Thirteenth" numbered paragraph of the complaint, it denies that during any of the years 1926, 1927, 1928 and 1929, there was diverted away from and taken in the State of Colorado by its officials, or agents, or representatives, or other citizens, or residents, or corporations, from the Laramie River and its tributaries in Colorado, amounts of water for irrigation of acreage in excess of the amounts by said decree authorized for the purpose of irrigating 4,250 acres of meadow lands in the State of Colorado; denies that there was used or consumed in the State of Colorado for irrigating meadow lands any amount of water in excess of 4,250 acre-feet; denies that there was taken from the Laramie River for irrigating meadow lands in the Laramie River valley in Colorado in any of said years any amount of water such that the supply available at the state line between Wyoming and Colorado was thereby reduced in excess of 4,250 acre-feet.

Defendant denies that during any of said years there was irrigated more than 4,250 acres of natural hay meadows.

With respect to the charges in said "Thirteenth" paragraph concerning excessive diversions during the four years specified, defendant states that irrigation as practiced on these mountain "meadow lands" is by the so-called "flooding" system, in which the water is turned out on the meadow lands and permitted thereafter to run through the irrigation season of from 50 to 60 days. That the valley of the Laramie River, in which this method of irrigation is practiced, is in most places not in excess of one-half mile in width, and the land is underlaid with gravel, and, upon applying the water, the same returns almost immediately to the several streams, either by surface flow or through said

gravel, and such diversions do not substantially diminish the flow, and the water is re-diverted several times over before it leaves the state. The method of use and application of water as practiced in Colorado is identical with that followed in the mountain valleys of the Laramie and Little Laramie in Wyoming, and in both states it is and at all times has been the common practice in irrigation of native hay meadows to divert large quantities and to keep the water flowing and circulating without cessation across the meadows and back to the stream throughout the growing season.

That it would be wholly impracticable satisfactorily to operate these "meadow" ranches if the several Colorado appropriators were limited to a total of 4,250 acre-feet as measured at the headgates of the respective irrigation ditches; that in the former suit of the State of Wyoming against the State of Colorado, no complaint was made by plaintiff as to the method of use practiced by the several appropriators owning the so-called "meadow" appropriations, nor was such method in any wise attacked or questioned in the testimony adduced or arguments presented in that case. Such method of irrigation had been practiced since the time of original settlement of said ranches. That it was shown by the said testimony that the actual loss, or consumption of the flow of the Laramie River each year resulting from this system of irrigation was one acre-foot per acre, although it likewise was disclosed in such evidence that many times that amount was diverted and returned to the river during the process of meadow irrigation, and that the diversion of the additional amounts of water caused no other loss to the river supply. This same practice and method has been followed without change since the date of the entry of decree in said former case. Defendant alleges that no more acreage of meadow lands is being irrigated than was irrigated in Colorado previous to and at the time of the former trial, and that the same amount of water is being consumed annually in the irriga-

tion of said meadows as was consumed previous to said trial.

Defendant concedes that under the decree rendered in such former case, these mountain appropriators should be limited to the ditches constructed and in operation prior to the entry of the former decree; and that the number of acres of hay meadows irrigated should not be exceeded, and is willing to assure to plaintiff that the same shall not be exceeded, and to afford all cooperation necessary to that end, or otherwise to abide the decree of this court in the matter of affording such adequate assurance to the plaintiff, but avers that the former decree of this court is not susceptible to the construction that the meadow appropriations are subjected to a limitation of 4,250 acre-feet of diversions measured at the headgates of the respective ditches.

EIGHTH: For answer to the charges contained in the "Fourteenth" paragraph of the complaint, the defendant states:

I.

As to the *Bob Creek Ditch*, the location, description and capacity thereof are admitted as stated, and likewise as to the "small ditch" mentioned in the *second* subdivision of said paragraph "Fourteen," and the diversions as stated are likewise admitted, save that, according to the report in the office of the State Engineer, the quantity diverted in the year 1929 was 1140 acre-feet and not 1153 acre-feet as stated.

With respect to the charge of diversions by means of the Bob Creek Ditch and Bob Creek Ditch Extension occurring on the 17th of June, 1932, defendant states that, subsequent to the decision of this Court rendered on May 31, 1932, the State Engineer of the State of Colorado was not immediately informed as to the scope and effect of said decision, and that upon said 17th day of June, 1932, the matter of said diversions was for the first time definitely called to

his attention, and he was then advised by the Attorney General of the said State that he should not permit further diversions of water by means of said ditches until the further order of the court in the premises, and said diversions were thereupon ordered stopped, and from and after the 18th of June, 1932, they have ceased.

With respect to the *Columbine Ditch*, the existence, location, description and dimensions as stated in *subdivision 3* of paragraph "Fourteenth" are admitted, and likewise the diversions, as stated, by means of the said ditch in the years 1922 to 1929, inclusive, are admitted, save only the diversion as stated in the year 1922, in which year, according to the records of the office of the State Engineer, no water was diverted instead of 181 acre-feet as stated.

As to the charge concerning diversion practiced by means of this ditch on the 17th of June, 1932, said diversion ceased on the 18th of June, 1932, under order of the State Engineer, which order was obeyed under the circumstances hereinabove stated concerning the diversions by the Bob Creek Ditch and its extension.

And further with respect to said Bob Creek Ditch, said Bob Creek Ditch Extension, and Columbine Ditch, the defendant alleges that said ditches are now the properties of the Mountain and Plains Irrigation Company. The Bob Creek Ditch diverts its supply of water from Bob Creek, also known as Nunn Creek and certain other unnamed tributaries of said Bob or Nunn Creek, which is a tributary of Laramie River. Work on this ditch was commenced by survey September 24, 1897, and on October 17, 1898, a survey was commenced for an extension of the original project of Bob Creek Ditch. This extension discharges its water into the head of the original Bob Creek Ditch across the channel of Bob Creek. The owner claims that the work of the construction of the original project was completed in the year 1902. The extension ditch above mentioned was completed in the year 1920. The waters collected in and diverted by Bob Creek Ditch and Bob Creek Extension are

used for the irrigation of agricultural lands in the Counties of Larimer and Weld. Such waters are delivered into the main channel of the Cache la Poudre River and stored by means of exchange in a reservoir known as Gilmore Reservoir or in a reservoir known as Portner Reservoir. Bob Creek Ditch and the extension were conveyed by the Larimer and Weld Reservoir Company, the original owner thereof, on October 29, 1919, and by mesne conveyance became vested in the Mountain and Plains Irrigation Company on June 29, 1920.

The Bob Creek or Nunn Creek diversions occur at an altitude of approximately 9,975 feet, and the run-off period is from about the 16th of May until the 17th of July, the peak run usually occurring about June 1st. The maximum capacity of the ditch is approximately 55 cubic feet of water per second, but due to the elevation and the limited area of run-off, a comparatively small amount of water is capable of diversion, the maximum actual diversion to date having been the amount of 1174 acre-feet, diverted in the year 1923.

II.

With respect to the *Columbine Ditch:* This diverts its supply of water from Deadman Creek and Columbine Creek, and is now the property of the Mountain and Plains Irrigation Company. The water diverted and carried by means of this ditch is discharged into the North Fork of the Cache la Poudre. Said Deadman Creek and Columbine Creek are tributaries of the Laramie River.

The work commenced on said ditch by survey begun September 7, 1897.

Columbine Ditch Extension, also the property of the Mountain and Plains Irrigation Company, diverts its supply of water from a certain ravine located on the east line of Section 15, Township 10 North, Range 75 West of the 6th P. M., in Larimer County, Colorado, the headgate being located about 1120 feet north of the southeast corner of said

Section 15. The general course of the ditch is in a southerly direction, discharging its water into the North Fork of the Cache la Poudre River. Work was commenced on this extension by survey September 17, 1898.

By mesne conveyances these ditches became the property of the Divide Canal and Reservoir Company, the Columbine Ditch becoming part of the so-called "Sand Creek Ditch System."

The original project was to divert water from Deadman Creek into Sand Creek, and from Sand Creek by another ditch into Sheep Creek, thence through Sheep Creek into the North Fork of the Cache la Poudre River, whence it would find its way to the main stream of the Cache la Poudre. However, for the purposes of the Divide Canal and Reservoir Company it was found that the original project was not feasible, and by deed dated October 4, 1919, said company conveyed by quitclaim deed to Roy A. Portner the Columbine Ditch, and thereafter Portner, on October 27, 1920, conveyed the ditch to the Mountain and Plains Irrigation Company.

This ditch is located at an altitude of approximately 9,500 feet, and the run-off period is limited to approximately from May 16th to July 17th, the peak of flow being reached about the 1st of June.

The facts with respect to utilization of the water diverted and carried by means of this ditch are identical with those stated concerning the Bob Creek Ditch.

Since the acquirement of the Columbine Ditch and Columbine Ditch Extension by the Mountain and Plains Irrigation Company, they have been maintained and operated by said company during the irrigation season and water diverted in each season when available for such diversion, and by reason of the diversions and applications to beneficial use of water obtained from said Bob Creek and Columbine systems, vested rights were claimed to appropriations for the same as of the dates herein stated of com-

mencement of work by the said Mountain and Plains Irrigation Company and the diversions made as charged in the complaint were made under such claim of right.

III.

Answering the *fourth* subsection of said paragraph "Fourteenth," concerning the "Lost Lake System," defendant admits the existence, location, capacity and use of the several lakes referred to, and states that the construction of Lost Lake commenced in the year 1890 and resulted in the storage of water and diversion through Chambers Lake by the Water Supply & Storage Company in the spring of 1891. The reservoir was constructed by placing a dam across an unnamed gulch tributary to the Laramie River, and impounding water to a depth of 15 feet. The outlet from this reservoir is into Chambers Lake and thence down the Poudre, and storage at the depth mentioned gives an estimated capacity of 12,541,030 cubic feet, or approximately 288 acre-feet.

Laramie Lake was constructed at the same time as Lost Lake, and water was stored and used for irrigation in the spring of 1891. The dam was 11 feet in height, with an estimated capacity of 14,817,744 cubic feet, or approximately 340 acre-feet. The outlet from this lake is into Lost Lake and the water is taken through Lost Lake and into Chambers Lake, and thence down the Cache la Poudre.

The Lily Lakes construction was commenced on June 1, 1912, and water was stored and used for irrigation purposes in the spring of 1913. There is a storage depth in this reservoir of 5 feet and an estimated capacity of 7,747,189 cubic feet, or approximately 178 acre-feet. The outlet to this reservoir is through Laramie and Lost Lakes into Chambers Lake.

These lakes are small and their filling is uncertain. The "Lost Lake System" is not connected with the "Skyline" Ditch. They, however, have the same outlet into Chambers

Lake, and are operated under the same general plan, and the lake system supplements the other diversion, and both togther make up what is termed the "Laramie River Diversion of the Water Supply & Storage Company." Defendant states that, in accordance with its understanding of the force and effect of the former decree of this Court, it should not be construed so as to prohibit the continued operation of the "Lost Lake System" in connection with the permitted diversion of the Water Supply & Storage Company and as an adjunct to its "Skyline Ditch" diversion, so long as the permitted amount of 18,000 acre-feet is not exceeded.

With respect to the charge in the *sixth* subsection of said paragraph "Fourteenth," concerning the storage of water in Lost Lake, Laramie Lake and Lily Lake, on the 17th day of June, 1932, defendant states, at a time when the permitted diversion by the Water Supply & Storage Company, through its Skyline Ditch, in the amount of 18,000 acre-feet had not been exceeded, the State Engineer of the State of Colorado, by order, directed and required the cutting of the dykes of the said lakes so that the quantity of water therein impounded became available to the appropriators of water of the Laramie River in the State of Wyoming, and that such cutting of dykes occurred on or about the 21st of August, 1932.

IV.

Defendant answering those portions of the "Fourteenth" paragraph of the amended bill of complaint pertaining to *The Wilson Supply Ditch*, and particularly the first or unnumbered paragraph thereof, and subdivisions 5, 6, 7, and 8, and all of the "Fifteenth" paragraph says:

That The Wilson Supply Ditch, and the Deadman or Deadman Feeder Ditch, the Deadman Ditch, the Divide Ditch, and Sand Creek Ditch, and the alleged Deadman Extension Ditch, mentioned and described in said amended complaint, are all one and the same ditch, and are the same ditch mentioned and described in the evidence in the former

trial in this matter, and in the modified decree therefor, entered by this court October 9, 1922, and set forth in substance in the *seventh paragraph* of the amended complaint, in all of which said ditch is named and described as The Wilson Supply Ditch.

Defendant denies that there is any separate ditch, or portion of ditch, known as the "Deadman Extension Ditch," and states that the portion of ditch mentioned and described in said *subsection 6* of the "Fourteenth" paragraph is merely a section of the Deadman Feeder Ditch, located near the central part of said ditch, and the same is not an extension or an enlargement thereof, but on the contrary the same now is, and at the time of the original construction of said ditch was, a portion thereof; that the "Deadman Feeder Ditch" of the Wilson Supply Ditch heads or connects with Sand Creek near the head waters thereof, at a point in the northwest quarter of section 15, township 10 north, range 75 west, and extends thence in a general southerly direction with many winding courses following the contour of the mountain side through sections 15, 14, 22, 23 and 26, township and range aforesaid, and terminates at a point about 950 feet north of the quarter corner of said section 26, and the entire length is about 5 miles. That the whole thereof was originally constructed as one ditch, and appropriations of water were made thereby and therefor, as of the date of June 15, 1899, and ever since said entire line of ditch has been maintained and used to take and collect and divert water along the line thereof, and discharge the same into Sand Creek, which is used as a part of The Wilson Supply Ditch; that from the said point of discharge said water is carried in Sand Creek to a point near the south line of section 22, township 11 north, range 75 west, at which point all the waters collected by the Deadman Ditch, together with the waters appropriated from Sand Creek, are diverted from Sand Creek through and across the divide and into Sheep Creek, by an open ditch and tunnel, sometimes called "Divide Ditch" and some-

times "Sand Creek Ditch," but the same, however called, is a portion of The Wilson Supply Ditch.

That the upper or southerly portion of the Deadman Feeder Ditch as originally constructed and since maintained was 3 feet wide on the bottom, 7 feet at highwater line, and carried water 3 feet deep and had a capacity of 50 second-feet or more, for the first 3 miles and then for a short distance it was 4 feet wide on bottom, and for the last 1.3 miles before discharging into Sand Creek it was 8 feet on bottom and 13 feet wide at high water line, and carried water 3 feet in depth, with a grade of 5 feet or more per mile, and a carrying capacity of approximately 130 second-feet, as stated in said amended bill of complaint.

That said The Wilson Supply Ditch, where the same connects Sand Creek with Sheep Creek, was and is constructed 10 feet wide on the bottom, 16 feet wide on top, and carried water 5 feet in depth, with a grade of 10 feet per mile, and a capacity of approximately 300 second-feet. That said The Wilson Supply Ditch was all constructed as one enterprise, and of the foregoing dimensions and capacity, and work of construction thereof was begun in June, 1899, and an appropriation of water therefor was made as of date of June 15, 1899, in the amount of 288 second-feet from the waters of Sand Creek and from Deadman Creek and tributaries jointly, and said appropriations of water are the same shown in the evidence in the former trial and mentioned and described in the modified decree of this court entered October 9, 1922. That in the year 1904, pursuant to the laws of Colorado, a proceeding was duly commenced in the district court of Larimer County, Colorado, to adjudicate appropriations of water in water district No. 48 in State of Colorado, which includes Laramie River, and said proceeding was case 1885 in said court, entitled "In the matter of the adjudication of priorities of right to water in water district No. 48, division No. 1 of State of Colorado."

That the owner of The Wilson Supply Ditch appeared in

said proceeding and filed its statement of claim, and submitted proof concerning the same, and on October 11, 1906, said court made and entered a decree of and concerning said The Wilson Supply Ditch and its appropriations of water, therein described as "The Sand Creek Ditch System," which decree awarded said ditch priority No. 38, in said water district, as of the date June 15, A. D. 1899, in the amount of 288 second-feet, from the waters of said Deadman Creek and tributaries, and Sand Creek, in the State of Colorado, which said appropriations of water were made long prior to the year 1902, and are the same appropriations of water mentioned and confirmed to said The Wilson Supply Ditch by the modified decree of this court in the former proceedings on October 9, 1922, and not otherwise.

That the water available under said appropriation can be procured for only a short period of time during each year, and then only in variable amounts, from day to day, and by reason of the cold weather the daily run often varies as much as 50%, on account of the thawing and freezing weather at said altitude. That the water supply available varies greatly from year to year in accordance with the quantity of snow which falls on the watersheds of said creek; that occasionally for a few hours in a day the full amount of the appropriation can be procured for a few days in the season, often only 10 to 25 second-feet of water can be procured to supply said appropriation; that water can be procured only from about the middle of May to about the first of July in any one year varying according to the season.

That during each year since the initiation of said appropriation, the owner of said ditch has diverted such water as was available and defendant states on information and belief that of the water annually diverted, about 60% thereof is obtained from Deadman Feeder of The Wilson Supply Ditch, and the remaining part from the waters of Sand

Creek, which proportions also vary from time to time, according to the amount of water in said streams.

Admits that during the year 1929 and 1930, the owner of said The Wilson Supply Ditch did some work of surveying and making repairs on that portion of said ditch mentioned in the *sixth subdivision* of paragraph "Fourteen" of the amended complaint, and said work of cleaning and repairing was done upon about a mile of the central portion of the Deadman Feeder Ditch. On information and belief defendant states that said portion of said ditch was so constructed on the mountain side that it was difficult to maintain the lower embankment thereof, and keep it from caving or breaking; that in order to strengthen the bank and make it more secure, it was necessary in getting material therefor, to take earth from the inside of said ditch, and in so doing, it widened the ditch at said point; that said work of repair was done solely for the purpose of strengthening the embankment, and not for the purpose of widening the ditch to carry more water; that no more water was taken or carried in said portion of said ditch so repaired than theretofore; that such work of repair is frequently necessary on any irrigation ditch, and particularly a ditch built on the mountain side; that since said repair work no greater quantity of water has been taken through said portion of said ditch than before, and there is no intention to take or divert more water by reason of the said repair work.

Defendant denies that the owner of said The Wilson Supply Ditch has taken or diverted any water from the tributaries of the Laramie River or Sand Creek contrary to, or in violation or disregard of, the terms of said modified decree authorizing the diversions of water by said The Wilson Supply Ditch.

Defendant admits the allegations concerning that portion of The Wilson Supply Ditch and its appropriations of water contained in *subsection 5* of the "Fourteenth" para-

graph of the bill, save that it states that the head of said ditch or point of connection with Sand Creek is located in the northwest quarter of section 15 instead of southeast quarter thereof and avers that the grade of said ditch is more than 5 feet per mile.

Answering the matters stated in subsections 6, 7 and 8 of said "fourteenth" paragraph of the bill, defendant denies that there is any portion of The Wilson Supply Ditch known as "Deadman Extension Ditch," and denies that there is or has been any extension or addition made to said ditch since the original construction thereof, as hereinbefore stated.

Defendant admits that the upper portion of the Deadman Feeder Ditch for the first 3 miles was 3 feet wide on the bottom, 7 feet wide at high water line, and carried water 3 feet in depth, and 5 feet or more in fall, and the capacity of 48 second-feet or more, and that for the lower 1.3 miles thereof the dimensions and capacity are as stated in the *fifth subdivision* of said paragraph.

NINTH: With respect to the matters set forth in the "Fifteenth" paragraph of the Amended Complaint, defendant admits that the modified decree heretofore entered by this court on October 9, 1922, recognized the appropriations of The Wilson Supply Ditch and confirmed to the owner thereof the right to continue to divert from Deadman Creek and its tributaries the amount of water appropriated thereby prior to the year 1902, being the existing appropriations of said ditch, and defendant avers that said existing appropriations were made as of the date June 15, 1899, both from Deadman and Sand Creek, and said appropriations had been used and enjoyed until the rendition of said modified decree and have since been so used and enjoyed. Denies that the owner of said The Wilson Supply Ditch had not made an appropriation of water therefor prior to the year 1902, and, on the contrary, avers that the appropriations of water for

said ditch were made and perfected as of June 15, 1899, the date when said ditch was constructed, and not otherwise.

Defendant admits that in June, 1932, the owner of The Wilson Supply Ditch diverted water through Deadman Feeder Ditch *and also from* Sand Creek, but denies that said diversion was unlawful, injurious to plaintiff, or contrary to the terms and provisions of said modified decree, or that the same was in violation of the rights of any other appropriator from said Sand Creek.

Defendant admits that the map marked exhibit "A" and attached to the amended complaint shows, for illustrative purposes, the location of The Wilson Supply Ditch and the several portions thereof, under the various names used in relation thereto, and avers that if a line were drawn from the point of the lower or Deadman Ditch (arrow) to the upper or Divide Ditch (arrow) the same would show the line of Sand Creek and connection between two portions of The Wilson Supply Ditch or said Sand Creek Ditch system.

TENTH: Admits the allegations of the "Sixteenth" paragraph of the Amended Complaint concerning the pendency in the district court of Larimer County, Colorado, of applications filed on behalf of the Water Supply & Storage Company, as owner of Laramie Lake, Lost Lake and Lily Lake, for the purpose of having decreed to said owner the authority to divert and store water for irrigation purposes in said reservoirs.

ELEVENTH: Defendant likewise admits the allegations of the "Seventeenth" paragraph of the Amended Complaint concerning the pendency in the district court of Larimer County, Colorado, of applications on behalf of Mountain and Plains Irrigation Company for adjudication of rights of Bob Creek Ditch, sometimes known as Nunn Creek Ditch, and the facts in said paragraph stated concerning the allegations of the petition of said The Mountain and Plains Irrigation Company.

With respect to the charges of the "Sixteenth" and

"Seventeenth" paragraphs of the Amended Complaint, concerning the pendency of such adjudication proceedings in the district court of Larimer County, defendant states its understanding of the force and effect of the former decree of this Court to be that such district court should properly proceed in the matter of such adjudication of rights of the respective claimants of water from the Laramie River in Colorado without interference, and that this Court is not concerned with such adjudication or with diversions practiced under rights therein to be adjudicated so long as the recognized and permitted amounts of diversions are not exceeded.

TWELFTH: Defendant admits that the topographical map of the watershed of the Laramie River and its tributaries in Colorado, attached to the Amended Complaint and marked "Exhibit A," shows for illustrative purposes the location of the diversions described in the Amended Complaint, but denies that it is a complete or accurate showing of such locations.

THIRTEENTH: Defendant admits the facts of the conferences as alleged in paragraph "Nineteenth" of the Amended Complaint, and that thereat assertion was made on behalf of Wyoming that diversions of water made in Colorado were excessive and unlawful, and that such assertion was denied by and on behalf of Colorado.

Defendant admits that the officials of Colorado, replying in writing to the protest of the State of Wyoming, stated that they were at all times willing and anxious to abide by the terms of the decree of this Honorable Court, and defendant states that it is now willing to abide such decree; and states that the greater part of the controversy then existing between the parties was due to a difference of opinion as to the force and effect of the said decree, the defendant then contending that the said decree was not susceptible to the construction that thereby the vested appropriations of Colorado appropriators other than the owner

of the tunnel appropriation were curtailed, limited, or divested by reason of the proviso of the said decree.

FOURTEENTH: For answer to the "Twentieth" paragraph of the Amended Complaint, the defendant denies the allegations thereof and disavows any intention or purpose to increase the diversion of water from the Laramie River and its tributaries for irrigation of lands in Colorado, and states that its purpose is strictly to abide by and obey the decree of this Court entered in the former proceeding and also the decree herein to be rendered.

Defendant, however, states that when the water is available it will permit the diversion through the Laramie-Poudre tunnel, by its feeders, ditches and headgates leading thereunto from the Laramie River and its tributaries in Colorado, of an amount of water up to the maximum permitted by said decree; and denies that thereby the amount of water determined by said decree as being available to Wyoming as against said diversion by citizens of Colorado will be reduced or consumed, or that Wyoming thereby will be deprived of protection under said decree to the use of water to which it was determined by said decree to be entitled. And defendant further states that, with respect to the so-called "meadow" appropriations, unless and until otherwise directed by order of this Court, it will permit their utilization in manner as they have been wont to be used and enjoyed, to-wit, by the method of "flooding" as herein fully described.

And further defendant admits that, until otherwise directed, it will continue to permit the diversion by the owner of The Wilson Supply Ditch of the quantities of water available for diversion by means of such ditch, said use not having been changed nor the diversion increased since the date of the decree of this Court in the former suit, and the appropriation therefor having vested prior to the year 1902.

Defendant further states that, when water is available, it

will permit the diversion through the "Skyline" Ditch from the Laramie River of an amount of water up to the maximum permitted by said decree.

With respect to the allegations of the Amended Complaint concerning diversions by Columbine and Bob Creek Ditches and by means of the so-called "Lost Lake System," defendant states its purpose to be to prevent the same until the further order of the Court in the premises, being thereunto apprised by decision of this Court rendered May 31, 1932. The defendant, however, states its understanding of the force and effect of the former decree to be that the State of Colorado is limited to 37,750 acre-feet plus the amount to be determined herein to be available to the Wilson Supply Ditch, and that the decree of this Court did not undertake to make a determination of the respective rights of the several appropriators in Colorado in such permitted maximum of total diversion, and that the division of such total award may of right be made by the district court of Larimer County, Colorado, or other court of appropriate jurisdiction in the said state.

The defendant disavows and disclaims any intent or purpose on its part in connection with any of the matters set forth in the Amended Complaint to disregard or violate the decree of this Court as heretofore rendered, or to disobey in any respect the decree to be herein rendered.

For Answer to the Second Cause of Action:

FIRST: Defendant refers to the admissions, denials and allegations set forth in its defense to the First Cause of Action, and makes all the said matters and things set forth in said defense part of this its defense to the Second Cause of Action, to the same effect as though herein specifically set forth.

SECOND: It admits the request set forth in the "Second" paragraph of said Second Cause of Action and the denial thereof, and that the State of Wyoming has an interest in said water of the Laramie River watershed, by virtue of the decree of this Court; denies that Wyoming is compelled to rely on the measurements made by the State of Colorado, and, on the contrary, states that Wyoming is permitted free access to make its own measurements in the State of Colorado, and to inspect and check upon the measurements and measuring devices of the State of Colorado along its streams and tributaries from the Laramie River, and has for several years last past been doing so, and Colorado is willing that it shall continue to do so.

THIRD: It denies the allegations of the "Third" numbered paragraph in said Second Cause of Action in respect of permitting the State of Wyoming to install structures in the Laramie River and its tributaries in the State of Colorado or in any trans-mountain ditches, lakes or reservoirs, by means of which water is being or may be diverted in the State of Colorado from said water-courses, lakes and reservoirs; alleges that there is no necessity for such installation; denies that said installation of gauges, measuring devices or structures of any kind, or measuring of such waters, should be carried on by the federal government at the expense of either of said states.

WHEREFORE, the State of Colorado, having fully answered the Amended Bill of Complaint, and having made

full disclosures with respect to the several acts charged against it, and also having set forth the several rights of its citizens and appropriators of the waters of the Laramie River in Colorado, affirms its desire to abide by the determination of the Court and in all things to conform to its decree as to the matters presented in the Amended Bill of Complaint. Defendant submits, however, that beyond quieting the rights of the State of Wyoming and the State of Colorado and their respective representatives, citizens, and residents, in the waters of the Laramie River in Colorado conformable to the issues herein, no further action by this Court is required.

THE STATE OF COLORADO,

By CLARENCE L. IRELAND,
Attorney General,

GEORGE A. CROWDER,
Deputy Attorney General,

E. J. PLUNKETT,
Assistant Attorney General,

PAUL W. LEE,
Special Counsel,

Solicitors for Defendant.

STATE OF COLORADO,
CITY AND COUNTY OF DENVER } ss.

CLARENCE L. IRELAND, being duly sworn, on his oath deposes and says: That he is Attorney General of the State of Colorado; that he has read the above and foregoing Answer to the Amended Bill of Complaint and that the facts therein set forth, save and excepting those averred on information and belief, are true; and that as to the facts therein alleged upon information and belief affiant verily believes said facts are true.

CLARENCE L. IRELAND.

Subscribed and sworn to before me this 3rd day of September, 1932. My commission expires August 7, 1934.

(NOTARIAL SEAL)

ELIZABETH D. PATTEN,
Notary Public.

STATE OF WYOMING,
COUNTY OF LARAMIE } ss.

SERVICE of a copy of the Answer of the State of Colorado to the Amended Original Bill of Complaint in the case of State of Wyoming vs. State of Colorado, Original No. 15, is hereby acknowledged to have been received by me, this .... day of ....., A. D. 1932.

JAMES A. GREENWOOD,
Attorney General of Wyoming,
and Solicitor for Complainant.

FILE COPY

DEC 10

In the Supreme Court of the United States

October Term, 1935

No. 10, Original

In Equity

THE STATE OF WYOMING,
Complainant,

vs.

THE STATE OF COLORADO,
Defendant.

Complainant's Brief

RAY E. LEE,
Attorney General of the State of Wyoming.

JAMES A. GREENWOOD,
Special Counsel for the State of Wyoming,
Cheyenne, Wyoming.

ATTORNEYS FOR COMPLAINANT.

THOS. F. SHEA,
Deputy Attorney General of Wyoming.

WM. C. SNOW,
Assistant Attorney General of Wyoming.
OF COUNSEL.

WYOMING LABOR JOURNAL, CHEYENNE

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In the
Supreme Court of the United States

October Term, 1935

No. 10, Original

In Equity

THE STATE OF WYOMING, *Complainant,*
vs.
THE STATE OF COLORADO, *Defendant.*

COMPLAINANT'S BRIEF

STATEMENT

The State of Wyoming, in her original Bill (Rec. pp. 4-20), complained that her right to the use of the water of the Laramie River, as determined in a decree of the United States Supreme Court dated June 5th, 1922, (Reported Vol. 259 U. S., p. 419) as modified by decree of October 9th, 1922, (Reported Vol. 260 U. S., p. 1) involving the relative rights to the use of the water of the Laramie River in the States of Wyoming and Colorado, is being disregarded in that Colorado is diverting and taking from the Laramie River and tributaries, amounts of water in excess of the quantity granted her under said decree, as modified, for the Colorado appropriations recognized by this Honorable Court in said decree as entitled to the use of said water and, also, for other and additional diversions not recognized in said decree and claimed by Wyoming to be unlawful.

To the original Bill of Complaint, Defendant, State of Colorado, interposed a motion to dismiss the Bill (Rec. pp. 25-28) on the ground that the Bill was insufficient to justify the granting of equitable relief, contending that the only question presented to engage the attention of this Honor-

able Court was a law question that should be determined at the outset and before the State of Colorado be required to answer. This Honorable Court overruled the Defendant's motion to dismiss, stating that the chief object of the Bill appeared to be the construction of the decree in the earlier suit; and the Court, in disposing of the motion to dismiss, stated in its opinion (286 U. S. 494, 506, 507; 76 L. Ed. 1245, 1251):

> "We are of opinion that the record, opinion and decree in the prior suit, here reviewed at length, show very plainly that the decree must be taken as determining the relative rights of the two States, including their respective citizens, to divert and use the waters of the Laramie and its tributaries. These rights were put in issue by the pleadings, displayed in the evidence, and considered and resolved in the opinion. Not only so, but the question of priority in time and right as between the appropriations in Colorado and those in Wyoming was directly presented by the pleadings and evidence and distinctly dealt with and resolved in the opinion."

Thereby settling the question of the construction of the decree in the former case, leaving for determination the question: Has the State of Colorado violated the decree?

Leave so to do having been granted, Wyoming then filed an Amended Bill of Complaint (Rec. pp. 32-50) and all further reference in Complainant's brief are to the Amended Bill.

First Cause of Action

Wyoming's Bill in Equity (Rec. p. 32) states that, by said former decree, certain Colorado appropriations were recognized as being entitled to divert from the Laramie River and tributaries, stated quantities of water, viz:

1. The Skyline Ditch appropriation of 18,000 acre feet aanually.

2. The Colorado Meadow Land Ditch appropriation of 4,250 acre feet annually.

3. The relatively small amount of water appropriated prior to 1902 through the Wilson Supply Ditch from the headwaters of Deadman Creek, a Colorado tributary of the Laramie River.

4. The Laramie-Poudre Tunnel appropriation of 15,500 acre feet annually.

That the total, authorized, annual Colorado appropriations from the Laramie River and tributaries to be diverted through and by means of the above designated ditches are 37,750 acre feet of water, exclusive of the Wilson Supply Ditch appropriation from Deadman Creek, a tributary of the Laramie River; that upon the basis of annual, available water supply for the use of appropriators in both states, limiting Colorado appropriations as aforesaid, there should remain for Wyoming appropriators, 272,500 acre feet of water; that the excessive and unlawful diversions of water by the State of Colorado have prevented, and are preventing the State of Wyoming from obtaining the amount of water which the decree in said former case decided would be available as her equitable portion thereof and as reasonably required for Wyoming appropriations.

The specific allegations of Wyoming's Bill relating to excess use of water within the State of Colorado are:

1. That the State of Colorado permitted, during the year 1926, a diversion of water from the Laramie River through and by means of the Laramie-Poudre Tunnel appropriation in excess of the authorized quantity of 15,500 acre feet per annum. (§ 9th, Rec. pp. 35, 36)

2. That the State of Colorado permitted, during the years from 1927 to 1929, inclusive, diversions of water from the Laramie River and tributaries through and by means of the Skyline Ditch in excess of 18,000 acre feet per annum. (§ 12th, Rec. p. 37)

3. That the State of Colorado permitted, during each year from 1926 to 1929, inclusive, diversions of water from the Laramie River and tributaries in excess of 4,250 acre feet per annum for the irrigation of 4,250 acres of Colorado meadow lands. (§ 13th, Rec. p. 37)

In addition to the allegations of excess diversions of water in Colorado through the above recognized means of diversion, the State of Wyoming alleges:

1. That the State of Colorado permitted, during each of the years from 1922 to 1929, inclusive, diversions of stated quantities of water from the tributaries of the Laramie

River to the Cache la Poudre River by a ditch designated as the "Bob Creek Ditch". (Bill, § 14th, subds. 1, 2; Rec. pp. 38, 39)

2. That the State of Colorado permitted, during each of the years from 1922 to 1929, inclusive, diversions of stated quantities of water from the tributaries of the Laramie River to the Cache la Poudre River by a ditch designated as the "Columbine Ditch". (Bill, § 14th, subd. 3; Rec. pp. 39, 40)

3. That the State of Colorado permitted, during the year 1926, the diversion of 448 acre feet of water from the watershed of the Laramie River to the Cache la Poudre River by means of the Lost Lake System of reservoirs. (Bill, § 14th, subd. 4; Rec. pp. 40, 41)

4. That prior to 1902, no water had been appropriated from the headwaters of Deadman Creek through the Wilson Supply Ditch. (Bill, § 15th; Rec. pp. 43, 44)

(a) That the Wilson Supply Ditch has been continually enlarged in capacity for the purpose of increasing the quantities of water that may be, and are thereby annually diverted from the Laramie River watershed. (Bill, § 14th, subd. 8; Rec. pp. 42, 43)

(b) That there was not, at the time of the filing of Complainant's Amended Bill in Equity, an existing lawful appropriation of water from Deadman Creek through said Wilson Supply Ditch. (Bill, § 15th; Rec. p. 43)

(c) That on June 20th, 1932, the State of Colorado was permitting the diversion through the Divide Ditch from Sand Creek to Sheep Creek, of 43.65 cubic feet of water per second of time. (Bill, § 15th; Rec. p. 44)

(d) That such diversion included water coming from Deadman Creek and tributaries into Sand Creek; also, all Sand Creek water above the diversion gate on Sand Creek. (Bill, § 15th; Rec. p. 44)

(e) That such diversion prevented the water of Sand Creek from continuing on down the channel of said stream to and for the use of appropriators from said stream in Wyoming whose appropriations are earlier and, therefore, prior in time to the Colorado appropriations thus diverting and taking said Sand Creek water. (Bill, § 15th; Rec. p. 44)

5. That there are proceedings pending in the courts of Colorado for the purpose of adjudicating the right to use said Lost Lake Reservoir System to divert and store the waters of the tributaries of the Laramie River. (Bill, § 16th; Rec. pp. 44, 45)

6. That there are proceedings pending in the courts of Colorado for the purpose of adjudicating with priority the right of the Bob Creek Ditch to divert from the Laramie River Basin, water for irrigation in the State of Colorado. (Bill, § 17th; Rec. p. 45)

7. That to permit the State of Colorado to continue such diversions of water from the Laramie River and tributaries in disregard of the rights of the State of Wyoming and in violation of the terms of said former decree, will result in finally consuming all of the water of the Laramie River which was allocated to the State of Wyoming in said former decree. (Bill, § 20th; Rec. p. 46)

8. That the State of Wyoming made efforts to obtain the cooperation of the State of Colorado in the installation and operation of gauging stations for the purpose of determining the volume of water diverted in the State of Colorado from the Laramie River and tributaries and, also, sought permission from the State of Colorado to install gauging and measuring devices at her own expense to determine the quantities of water diverted from the Laramie River; that such requests were refused and denied; that prior to the commencement of this suit, the State of Wyoming made written protest to Colorado against said excessive and unlawful diversions. (Bill, § 19th; Rec. p. 46)

Second Cause of Action

That the State of Wyoming made request on March 8th, 1928, in writing, of the State of Colorado for permission to install measuring devices to inventory the volume of water of the Laramie River and tributaries in Colorado; that this request was refused in writing. (Bill, § 2nd; Rec. p. 48)

That because of the refusal to cooperate with Wyoming in such inventory or to consent that the same be made by Wyoming, an order of this Honorable Court should be entered authorizing such measurement and inventory by Wyoming or that such measurement should be made by the Federal Government. (Bill, § 3rd; Rec. pp. 48, 49)

To Complainant's Bill, the State of Colorado answered (Rec. pp. 51-70):

1. Paragraphs 1 to 7, inclusive, of the Bill (Rec. pp. 32-35) are admitted. (Ans. § 1st; Rec. p. 52)

2. The excessive Skyline diversions, as alleged in paragraph 12 of the Bill (Rec. p. 37) are admitted, except that 677 acre feet less than the amount alleged were diverted in 1929. (Ans. § 6th; Rec. p. 54)

3. The location, description and capacity of the Bob Creek Ditch, as alleged in paragraph 14, subdivision 1, (Rec. pp. 38, 39) and the diversions, with slight modification as to the amount diverted in the year 1929 (Rec. p. 39), are admitted, the admitted diversion being 13 acre feet less than the amount alleged; also, the existence, location and description of the small Bob Creek extension ditch, as alleged in paragraph 14, subdivision 2, (Rec. p. 39) are admitted. (Ans. § 8th, subd. 1; Rec. pp. 57, 58)

4. The location, description, existence and dimensions of the Columbine Ditch, as alleged in paragraph 14, subdivision 3, (Rec. pp. 39, 40) and the diversions, except as to the year 1922 when it is alleged no water was diverted by the Columbine Ditch, are admitted. (Ans. § 8th, subd. 1; Rec. p. 58)

5. The existence, location, capacity and use of the Lost Lake Reservoir System (Rec. pp. 40, 41) are admitted. (Ans. § 8th, subd. 3; Rec. p. 60)

6. The pendency of proceedings in the District Court of Larimer County, Colorado, (Rec. pp. 44, 45) for the purpose of having adjudicated the authority to divert and store water in the Lost Lake Reservoir System, is admitted. (Ans. § 10th; Rec. p. 67)

7. The pendency of proceedings in the District Court of Larimer County, Colorado, (Rec. p. 45) for the purpose of having adjudicated the right to divert water through the Bob Creek Ditch, is admitted. (Ans. § 11th; Rec. p. 67)

The Defendant has pleaded in justification of these admitted acts, allegations which involve only the construction of the former decree. In defense of the admitted excess diversions through the Skyline Ditch (Rec. p. 37), Defendant pleads (Ans. § 6th; Rec. p. 55) that the total diversions from

the Laramie River to the Cache la Poudre River in those years did not exceed an aggregate of 37,750 acre feet of water and, therefore, such excess diversions were within the limit fixed by the decree in the former case.

The Defendant does not deny the alleged diversions of water in the amounts stated in paragraph 13 of the Bill (Rec. pp. 37, 38) for the irrigation of meadow lands, but states that by such diversions, there is not diverted and taken in the State of Colorado from the Laramie River and tributaries in Colorado, water in excess of the amount, by the said former decree authorized, for the purpose of the irrigation of 4,250 acres of meadow lands in Colorado. (Rec. pp. 55, 56)

In paragraph 8th of the Answer (Rec. pp. 58, 59), the Defendant states the purpose of the Bob Creek Ditch and the Columbine Ditch. In the third subdivision of paragraph 8th (Rec. pp. 60-62), Defendant seeks to justify the existence and use of the Lost Lake Reservoir System as an auxiliary to the Skyline Ditch.

The Admissions of Defendant

The admissions of Defendant as to the effect of the former decree, as alleged in paragraph 5th of the Bill (Rec. pp. 33, 34), are:

1. That the court found the annual water supply available for the appropriations in both Wyoming and Colorado to be 288,000 acre feet per annum. (Ans. § 1st; Rec. p. 52)

2. That the rights to divert 18,000 acre feet of water through the Skyline Ditch and 4,250 acre feet of water through the Meadow Land Ditches are entitled to priority over many of the Wyoming appropriations.

3. That these two recognized Colorado appropriations, totaling 22,250 acre feet of water, were not to be deducted from the 288,000 acre feet, which is the available supply after they are satisfied.

4. That the total available annual supply of water for irrigation in Wyoming and Colorado out of the Laramie River and tributaries is 310,250 acre feet, in addition to the water of Sand Creek.

As alleged in paragraph 6th of the Bill (Rec. p. 34):

1. That Wyoming appropriations, dependent upon the available water supply of 288,000 acre feet, cover 181,500 acres of land. (Ans. § 1st; Rec. p. 52)

2. That the amount of water appropriated and reasonably required for the irrigation of said lands, is 272,500 acre feet. (Ans. § 1st; Rec. p. 52)

3. That there remains 15,500 acre feet of water subject to appropriation by the Laramie-Poudre Tunnel. (Ans. § 1st; Rec. p. 52)

As alleged in paragraph 7th of the Bill (Rec. pp. 34, 35):

1. That the decree should not prejudice the rights of the State of Colorado or any one recognized by her as duly entitled thereto, to continue to exercise the right existing, and thereby recognized, to divert and take from the Laramie River and its tributaries in the State of Colorado,

(a) 18,000 acre feet of water per annum by virtue of, and through the Skyline Ditch appropriation in Colorado;

(b) 4,250 acre feet of water per annum by virtue of, and through the Meadow Land appropriations in Colorado. (Ans. § 1st; Rec. p. 52)

The question of the available water supply and the allocation thereof are settled and Colorado, by the above admissions, is foreclosed from now questioning the supply and the allocation thereof. These admissions are in full accord with the terms of the decree in the former suit as construed in the opinion of this Honorable Court in the case at Bar (286 U. S. 494; 76 L. Ed. 1245) and neither state can now well assert a lack of understanding of the limitations placed upon her right to enjoy the use of the waters of the Laramie River and its tributaries.

ISSUES OF FACT

1. Did the Defendant, State of Colorado, divert from the Laramie River, via the Laramie-Poudre Tunnel in the year 1926, more than 15,500 acre feet of water?

2. Did the Defendant, State of Colorado, divert from the Laramie River and its tributaries, by the Meadow Land

Ditches during the years 1926 to 1929, inclusive, for the irrigation of Colorado meadow lands, more than 4,250 acre feet of water per annum?

3. Did the Defendant, State of Colorado, divert from the Laramie River, via the Skyline Ditch during the years 1927 to 1929, inclusive, more than 18,000 acre feet of water per annum?

4. Are the admitted diversions by the Bob Creek Ditch, the Columbine Ditch and the Lost Lake Reservoir System, in violation of the terms of the decree in the former case?

5. Does the Defendant, State of Colorado, accurately gauge and measure the amount of water diverted by the Colorado appropriators recognized in the decree in the former case?

6. Is the Defendant, State of Colorado, entitled to appropriate from the headwaters of the Deadman Creek, any water? If so, how much?

7. Does the full protection of Wyoming rights in the use of the water of the Laramie River demand the placing of the supervision of the Colorado diversions under a Federal Water Master?

GENERAL STATEMENT OF THE EVIDENCE

Only a brief general statement of the evidence will at this point be made, inasmuch as the evidence will be subsequently discussed and referred to in connection with the points in issue.

The Defendant introduced much evidence relating to the method used in the irrigation of the Colorado meadow lands to prove that not more than 4,250 acre feet of water were annually consumed in their irrigation; that it is the practice in irrigating these mountain meadows, to divert unlimited quantities of water from the natural channel of the stream and cause this diverted water to spread over the surface of the meadow lands and eventually find its way back to the stream, less the actual quantity consumed.

The admitted excess diversions through the Skyline Ditch, Defendant contends, are legal and submits evidence that the total diversions from the Laramie River to the Cache la

Poudre River in the years complained of did not exceed, in the aggregate, the amount of 37,750 acre feet of water. Evidence of the same character is submitted by the Defendant with reference to the admitted Bob Creek Ditch and Columbine Ditch diversions.

The operation of the Lost Lake Reservoir System is defended upon the theory that water can be diverted thereby to supplement the Skyline Ditch appropriation, because the Lost Lake Reservoir System and the Skyline Ditch are the property of the same party.

The evidence of Complainant and Defendant relating to the Wilson Supply Ditch or the Sand Creek Ditch System appropriation presents no material conflict as to when the construction was commenced, when water was first diverted from Sand Creek, and when water was first diverted from the headwaters of Deadman Creek. But it is contended by Complainant that the facts, as established, show that the Deadman Creek diversion is illegal; that, no water having been appropriated prior to 1902, none can subsequently be lawfully taken under the terms of the modified decree. Defendant contends that under the doctrine of relation, she has an established right to appropriate annually to the Sand Creek Ditch System from Deadman Creek and tributaries, the water of Deadman Creek.

The Defendant has been diverting and taking the waters of Sand Creek and tributaries, an interstate stream, in disregard of the rights of appropriators in Wyoming whose water rights have dates of priority earlier than the claimed date of priority of the Colorado appropriation from Sand Creek.

SUMMARY OF ARGUMENT

The opinion rendered by this Honorable Court on Defendant's motion to dismiss, appearing in 286 U. S., page 494, 76 L. Ed., page 1245, construing the decree entered in the former case of Wyoming vs. Colorado, et al., reported in 259 U. S., page 419, 66 L. Ed., page 999, modified in the opinion appearing in 260 U. S., page 1, 66 L. Ed., page 1026, disposed of the major questions, leaving for consideration the construction of the language of the modified decree relating to Colorado's right to divert water from the headwaters of Deadman Creek and a determination of the relative rights of Wyoming appropriators and Colorado appropriators from Sand Creek.

In addition to the opinion rendered on the motion, reviewing the scope and effect of the former decree, the admissions of Defendant in her answer further simplify the questions still to be disposed of, which the Record discloses are facts established by evidence largely free from substantial controversy which, Complainant contends, clearly establishes her contention that Colorado has been departing from the former decree and, in disregard of the rights of Complainant, has been taking excess quantities of water from the Laramie River and its tributaries, which has resulted in Complainant being denied the right to have available for use in Wyoming, the amount of water which the Court found in the former decision should be available for such use after the recognized Colorado appropriations have been satisfied.

Complainant's discussion of the evidence and argument are confined to these remaining questions now submitted for the Court's determination.

PROPOSITIONS OF LAW

I

Material averments in the Bill of Complaint which are admitted by the answer, are accepted as established and evidence in support thereof need not be produced.

Clements v. Nicholson; Moore v. Clements, 73 U. S. 299, 315; 18 L. Ed. 786, 789.

Robertson v. Perkins, 129 U. S. 233, 235; 32 L. Ed. 686, 687.

Forsyth v. Doolittle, 120 U. S. 73, 74; 30 L. Ed. 586.

II

Facts once determined will not again be considered in a subsequent suit between the same parties or their privies.

Wyoming v. Colorado, 286 U. S. 494, 508; 76 L. Ed. 1245, 1251.

Southern Pacific R. Co. v. United States, 168 U. S. 1, 48, 50; 42 L. Ed. 355, 376, 377.

Southern Pacific R. Co. v. United States, 183 U. S. 519, 528; 46 L. Ed. 307, 312.

English v. Arizona, Use of Griffith, 214 U. S. 359, 361; 53 L. Ed. 1030, 1032.

III

Diversion of water from the natural channel of a stream into a constructed ditch or conduit does not alone constitute an appropriation of the diverted water; there must, also, be application of the diverted water to beneficial use.

Milheiser, et al. v. Long, et al., 10 N. M. 99; 61 Pac. 111, 113.
Willey, et al. v. Decker, Adm'r, etc., et al., 11 Wyo. 496, 537; 73 Pac. 210.
Whalon v. North Platte Canal and Colonization Co., 11 Wyo. 313, 342; 71 Pac. 995.
Farm Investment Co. v. Carpenter, et al., 9 Wyo. 110, 122; 61 Pac. 258.
Moyer v. Preston, 6 Wyo. 308, 321; 44 Pac. 845.
Weldon Valley Ditch Co., et al. v. Farmers' Pawnee Canal Co., 51 Colo. 545; 119 Pac. 1056, 1057.
Long on Irrigation (2d ed.) § 105, p. 186.
Kinney on Irrigation and Water Rights (2d ed.) Vol. 2, § 707, p. 1215.
Wiel on Water Rights in the Western States (3d ed.) Vol. 1, p. 418.

IV

A decree of adjudication of a water right does not give the appropriator title or the right to the use of any water from a source of supply that is not a natural tributary to the stream from which the appropriation is made.

Bruening v. Dorr, et al., 23 Colo. 195; 47 Pac. 290, 292.
Ogilvy Irrigating & Land Co. v. Insinger, 19 Colo. A. 380; 75 Pac. 598, 599, 600.
Water Supply & Storage Co. v. Larimer & Weld Res. Co., 25 Colo. 87; 53 Pac. 386, 387.
Platte Valley Irr. Co. v. Buckers Irr. M. & Imp. Co., 25 Colo. 77; 53 Pac. 334.
Leonard v. Shatzer, 11 Mont. 422; 28 Pac. 457, 459.
Wilson, et al. v. Collin, et al., 45 Colo. 412; 102 Pac. 21, 22.
Petterson v. Payne, Water Com'r, et al., 43 Colo. 184; 95 Pac. 301.
Strickler v. City of Colorado Springs, 16 Colo. 61; 26 Pac. 313, 315.

Long on Irrigation (2d ed.) § 134, p. 234.
Wiel on Water Rights in the Western States (3d ed.) Vol. 1, § 381, p. 412; §§ 37, 38, pp. 36, 37; § 61, pp. 60, 61.
Kinney on Irrigation and Water Rights, (2d ed.) Vol. 2, pp. 1138, 1139.

The primary purpose of the present action is the protection of Wyoming rights under the decree of the United States Supreme Court, reported in 259 U. S., page 419, 66 L. Ed., page 999; 260 U. S., page 1, 66 L. Ed., page 1026, rendered in a former suit between the State of Wyoming and the State of Colorado which determined the relative rights of each state to divert and use for irrigation, the waters of the Laramie River. The questions to be now considered are limited to a construction of the former decree, (1) relating to the amount of water Colorado is entitled, under the former decree, to divert and take from the headwaters of Deadman Creek; (2) whether or not Colorado is entitled to divert the waters of Rawah Creek and other tributaries of the Laramie River under additional appropriations if the combined quantities diverted and taken from the Laramie River to the Cache la Poudre River, via the Tunnel, do not exceed annually, 15,500 acre feet; and (3) the relative rights of the appropriators under the laws of the two states to divert and take the waters of Sand Creek and tributaries. All other law questions are, upon the authorities referred to in support of the first and second propositions of law stated above, disposed of.

The answers to the two questions, the Deadman Creek diversions and the Rawah Creek diversions, depend exclusively upon the construction of the language of the former decree relating thereto. The determination of the relative rights of the Wyoming appropriators from Sand Creek to the right of the Colorado appropriator, must be settled by the application of the rule recognized in both states, that the appropriation first in time is first in right, although all appropriations from the stream are not withdrawn within the limits of the same state. (259 U. S. 419, 465; 66 L. Ed. 1013) The established dates of priorities of the Wyoming Sand Creek appropriations are free from dispute and the Colorado appropriation is admitted to have had decreed to it, priority date of June 15th, 1899.

In the former suit, this Honorable Court did not give consideration to, or have before it for determination, the relation of appropriators from Sand Creek in Wyoming to those in Colorado from the same stream and, further than to determine that Sand Creek is only nominally a tributary of the Laramie River, it was not given any consideration; however, because of the position taken by Colorado in the present action regarding diversions through the Wilson Supply Ditch, which diverts water not only from Sand Creek and its natural tributaries, but from the headwaters of Deadman Creek and other unnamed sources within the natural watershed of the Laramie River, the appropriations in both states have been shown in the Record and their relative priorities are displayed and the matter has been, without objection by either party, submitted on the merits and the determination thereof should be accomplished by the entry of such decree as the court shall find to be in accord with the facts as disclosed by the Record relating thereto.

ARGUMENT AND AUTHORITIES

I

The Laramie-Poudre Tunnel Diversion

In proof of the allegations of paragraph Ninth of the Bill (Rec. pp. 35, 36), Complainant offered in evidence her Exhibit No. 3, being a photostatic copy of Water Commissioner's Ditch Report, Water District No. 48, for the year 1926, (Rec. p. 974) which reports Tunnel diversions of 13,572 acre feet. This information is taken from an official record kept under the supervision of the State Engineer of the State of Colorado; and nothing could more forcefully illustrate the justice of Wyoming's complaint than the objection interposed by the attorney for Defendant, State of Colorado, to the admission of this exhibit:

Defense objects, "for the reason that it shows on its face that it is made from estimates and only partial readings, and as hearsay, and is incomplete, and it is not based upon daily measurements or other reliable data as required by law, and it is not the record required to be kept under the laws of the State of Colorado, and is not an original record of the office of the State Engineer of the State of Colorado, and as being incompetent, irrelevant and immaterial." (Rec. p. 165)

The character of the records and information which Wyoming has been compelled to rely upon with reference to the trans-mountain diversions from the Laramie River to the Poudre River, could not be better described than in the words of the above objection.

Contrasted with the information contained in this exhibit is the allegation in Defendant's answer, paragraph Third (Rec. pp. 52, 53), that 5,644 acre feet were, in the year 1926, diverted from the Laramie River, via the Tunnel, and no more. A repudiation of this official public record is found in the testimony of the witnesses for Defendant—Mr. Patterson, (Rec. p. 707) who gave a different figure—6,118 acre feet—as representing the total diversion by the Tunnel in the year 1926, although this witness says (Rec. p. 704) that the official records for the years 1926 to 1932 can be relied upon; and Mr. G. F. Smith, who testified to still another quantity—7,100 acre feet—for the year 1926, as being the extent of the Tunnel diversions of which he had any knowledge (Rec. p. 554), while Mr. Tipton (Rec. p. 851; Defendant's Exhibit No. D-3, Rec. p. 1611) gave 6,060 acre feet as the Tunnel diversion from May to September, 1926, and stated that DuVall's report for the same period gives 6,036 acre feet (Rec. p. 856), thus showing six different computations of amounts of water diverted by the Tunnel in 1926 in addition to the unreported quantities.

For the Complainant, three witnesses, Freeman, Powell and Zimmerman, testified to the fact that during the winter season of 1925 and 1926, unrecorded water was diverted from the Laramie River via the Laramie-Poudre Tunnel, and the witness Zimmerman testified that it is a common practice of the Defendant to make no record of the early and late diversions. (Rec. p. 125) Witness Freeman testified that on February 14th, 1926, water was passing from the Laramie River to the Cache la Poudre River unrecorded; that the gauge was not in operation. (Rec. pp. 146, 147) Witness Powell testified that the gauge was not operating on April 27th, 1926, when a flow of 27 second feet of water was being diverted through the Tunnel. (Rec. pp. 158, 159)

At pages 154 and 156 of the Record, is Mr. Freeman's statement that from December 13th, 1925, to May 3rd, 1926, approximately 3,000 acre feet of water passed through the Tunnel unrecorded. Mr. Freeman's statement (Rec. p. 148)

of his conversation with Mr. McAnelly as to what disposition is made of water that comes from the Laramie River into the Cache la Poudre River unrecorded, shows clearly that water from the Laramie River is diverted in quantities without any effort to keep a record thereof. The water commissioner of District No. 3 told Mr. Freeman that water diverted during the period when the gauge was not recording, was not accounted for (Rec. p. 152), and Mr. Powell stated that the unrecorded water is just distributed. (Rec. p. 159) Mr. Tipton says neither the water commissioner's reports nor the charts cover the total diversions in 1926. (Rec. p. 855)

The Defendant objected to anything said by the party living in the caretaker's quarters at the mouth of the Tunnel and in charge of the diversion works at the time of Mr. Freeman's December, 1925, visit, stating that the conversation of Mr. Freeman with Homer DuVall, in charge of the Tunnel diversion, was hearsay and that it was not certain Mr. DuVall was there in any official capacity. (Rec. pp. 146, 147; Testimony of witness Zimmerman, Rec. pp. 123, 124)

This is the condition of which Wyoming complains. There is no one in charge of the trans-mountain diversions from the Laramie River to the Cache la Poudre River who seems to have, or will assume any official responsibility for the operation of these diversion works or make and furnish any record of a reliable character. The testimony of Defendant's witness, G. F. Smith, is that Homer DuVall was in the employ of the Greeley-Poudre Irrigation Company as caretaker of the Laramie-Poudre Tunnel in 1925, up to December 13th, and in 1926, from March 24th to September 23rd (Rec. p. 552); but Mr. DuVall was the party found in charge of the Tunnel diversion as caretaker on February 14th, 1926. (Rec. p. 147) Mr. Mosier, the Colorado water official in District No. 48 where the trans-mountain diversions are made, said (Rec. pp. 544-546) that his records are inaccurate and cannot be relied upon.

Mr. Freeman's statement of unrecorded flow through the Laramie-Poudre Tunnel in 1926 is corroborated by witness Powell (Rec. pp. 158, 159) and witness Zimmerman (Rec. pp. 124, 125). There can be no doubt that water was, in the year 1926, being taken, without any record thereof being made, from the Laramie River to the Cache la Poudre River

via the Laramie-Poudre Tunnel diversion, which, together with the recorded flow, made a diversion for the year in excess of 15,500 acre feet. See testimony of Mr. Meeker (Rec. pp. 251, 253, 318) where the reported quantity for the year 1926 is also disclosed, the diverted quantity as reported being 590,120,320 cubic feet, which, converted into acre feet, are 13,572; and that it is a common practice to divert unreported and unrecorded water from the Laramie River to the Cache la Poudre River via the Tunnel diversion. (Testimony of witness Meeker, Rec. p. 251; Testimony of witness Zimmerman, Rec. pp. 125, 134)

The measuring device used to record diversions from the Laramie River via the Laramie-Poudre Tunnel, is operated under the personal supervision of the employees of the Colorado appropriators (Testimony of witness Turner for Defendant, Rec. pp. 560-562), and Wyoming's representative, Mr. Drummond, was not permitted to inspect the automatic gauge. (Testimony of witness Drummond, Rec. p. 171) The records made by these experienced or inexperienced employees constitute the basic data from which the official public records kept by Defendant are made. The necessity of possessing some experience to be able to make accurate discharge records, is testified to by witness Meeker for Complainant. (Rec. pp. 244-246)

Testimony by many experienced civil engineers was given relating to the installation and functioning of the improved Venturi flume, sometimes referred to as the "Parshall Flume," located at the outlet or east portal of the Tunnel where the measurments of the diverted water from the Laramie River for the Greeley-Poudre Tunnel appropriation are made. The quality of the evidence coming from many reputable and able experts upon this technical question of the measurement of flowing water in open channels or through measuring devices, even though in conflict upon the question of whether or not the installation is at a point where accurate results can be obtained within practical limits, is, for the most part, of high quality, given by experienced men.

There is no dispute that the device is of a standard, reputable type, in general use and, under favorable conditions, would perform in an acceptable and reliable manner if properly supervised by an experienced attendant; but there is no precedent, example or evidence from any of these wit-

nesses who knew of another instance where this type of measuring device had been placed in operation under conditions substantially similar to those prevailing at the location of the one under consideration. The designer, Mr. Parshall, admits that not even a test was ever made to determine accurate measurement of water passing through the flume where the throat of the flume was located at a curve from the direction of the approach channel, as in the instant case. (Rec. p. 680)

This particular type of measuring device is the product of some fifteen years of experiment and study by Mr. Parshall and he says that to get accurate results, the installation and supervision must be maintained by some one capable of operating the device in order to give proper records (Rec. p. 680); yet the actual operation of the Parshall flume at the east portal of the Tunnel is placed under the supervision of inexperienced men employed by the appropriators and, from the data furnished by such employees of the appropriators, the official public records are made. (Testimony of witness Turner for Defendant, Rec. p. 562)

Mr. Parshall has advised that the Tunnel installation is not a practical one. (Rec. p. 680. See, also, Complainant's Exhibit No. 97, Rec. p. 1209, being a memorandum statement of Mr. Parshall prepared in April, 1933, which condemns the Tunnel installation for well stated reasons that corroborate the testimony of the witness Meeker, Rec. pp. 281, 919, 922, 923; also, Complainant's Exhibits No. 57, Rec. p. 1069, and No. 100, Rec. p. 1212.) The testimony of these two outstanding, experienced and able engineers, Meeker for Complainant and Parshall for Defendant, whose ability and reputations are of the very highest, should be sufficient to establish beyond successful contradiction that the Tunnel installation is not a practical one and, therefore, records coming from it, prepared by inexperienced employees of the appropriators, cannot be accepted as accurate.

Mr. Lewis Stimson testified (Rec. p. 803) that on June 13th, 1933, sand and gravel were lodged within one foot of the staff gauge in the Venturi flume; and at page 269 of the Record, Mr. Meeker calls attention to the official statement of a former Colorado deputy state engineer who said (Rec. pp. 269, 270) that the Laramie-Poudre rating flume was the worst designed rating flume he ever saw and stated his

reasons, and Mr. Meeker stated his reasons for concluding that the Laramie-Poudre Tunnel Venturi flume was an unreliable measuring device. (Rec. pp. 271-275)

If the statements of Mr. Patterson, in describing the favorable location of the measuring flume on Sand Creek, (Rec. p. 725) are applicable when applied to the Laramie-Poudre Tunnel location, they would constitute a condemnation of its location; but Mr. Patterson also gives unreserved approval to the Tunnel flume location (Rec. pp. 738, 739) and says it is fortunate the approach channel has a bend in it.

Complainant submitted, in support of her allegation that the measurements of water diverted from the Laramie River to the Poudre River through the Laramie-Poudre Tunnel were not accurately made, her Exhibits Nos. 58 to 62, inclusive. (Rec. pp. 1070-1088) These exhibits are explained by Complainant's witness Meeker and the defects in the records and the careless manner in which they have been kept and made and the inaccuracy thereof, pointed out. (Rec. pp. 275-281) It is also pointed out that velocities of water passing through the flume are not uniform, and the note on Exhibit No. 59 (Rec. p. 1072) says, "Mrs. I. C. Turner, Observer, instructed how to read and replace charts and mark same." (Who is Mrs. Turner, and is she in charge of Tunnel diversion records?)

Defendant's witnesses Tipton (Rec. pp. 848, 849) and Patterson (Rec. pp. 704-724) contradicted the statements of Complainant's witness Meeker as to the deductions made by him as to the character of these records, Mr. Tipton stating that the Tunnel flume has performed well within practical limits. The evidence is not free from conflict as to the reliability of the data and information contained in these records, but there is no controversy as to how the same were obtained or as to who was in exclusive charge of these recording devices. Complainant has established that the records of the measurements of water diverted by the Laramie-Poudre Tunnel from the Laramie River to the Poudre River are not accurate and do not show the correct quantity diverted and that diversions are made each year without a record thereof being made. Whether the actual amount of water diverted by the Tunnel is more or less than 15,500 acre feet per annum, is immaterial; the Complainant is within her rights in insisting that an accurate measurement be

made and records showing accurate measurements of the total amount diverted should be available at all times.

Mr. Hinderlider defends the accuracy of the Colorado records and the method used by Colorado in measuring diversions of water from the Laramie River to the Cache la Poudre River and expresses a willingness on behalf of Colorado to cooperate with Wyoming in the measurement of water by such devices as are in operation to the end that Wyoming may be fully satisfied at all times with respect to the sufficiency and character of the data obtained. (Rec. pp. 812-814) This would not eliminate Wyoming's objections to the measuring and recording devices used as the basis of the records of water diverted from the Laramie River to the Poudre River, as they are operated only a part of the time and diversions are made each year through these diversion works between the dates of September and May, unrecorded.

Testimony of M. C. Hinderlider (Rec. p. 808): "The flume at the Poudre Tunnel is located in the only practical place where it might be located, because of the topographical and geographical conditions which prevail at the outlet of the Tunnel," giving his reasons therefor at page 810 of the Record. Mr. Hinderlider says that Defendant's Exhibit No. E-1, which appears at page 1494A of the Record, consists of the tabulation of all the current meter or discharge measurements made in the Venturi flume from the time it was installed up to and including the year 1932.

Defendant's Exhibit No. E-1, (Rec. p. 1494A) shows, in 1927, six meter measurements; in 1928, one meter measurement; in 1929, four meter measurements, three of which were made within the scope of a period of seven days; in 1930, four meter measurements; in 1931, no meter measurements; in 1932, eight meter measurements. This exhibit shows that no meter measurement was made before the 25th day of May and no measurement was made later than the 5th day of September in any year. This record supports Complainant's position that the record of diversions is not complete.

Mr. Hinderlider says (Rec. p. 811), from his experience and study of the results of discharge measurements made by means of current meter measurements in the present Venturi flume installed at the Laramie-Poudre Tunnel, regardless of the quantities of debris that from time to time accum-

ulate above and within the upper section of the rating flume, and regardless of the right angle bend in the concrete structure, such conditions do not materially affect the accuracy of the discharge of water through the throat section of the flume as determined by the theoretical rating curve. Mr. Baily, in Complainant's Exhibit No. 59 (Rec. p. 1071), contradicts Mr. Hinderlider's statement as to the accuracy of Tunnel measurements.

Witness R. J. Tipton (Rec. p. 828) says that he is employed by the State of Colorado as a special engineer in charge of interstate river investigations and water resource surveys; that one of his duties is to analyze the flow of interstate streams and the uses that are made of those streams, not only in Colorado, but in neighboring states through which those streams flow. At page 830 of the Record, Mr. Tipton says, in District No. 3, the Cache la Poudre River Basin reports are gathered very carefully and the reports as to the trans-mountain diversions into the Cache la Poudre Basin are determined each day, and states that the reports of trans-mountain diversions made by the water commissioner of District No. 3 are more accurate than reports made by any other water district in the state (Rec. p. 331); that these reports are determined and made from records of automatic charts by determining the hourly quantity as it flows past the particular point in question and from these hourly quantities, the daily quantity is determined.

The statement that reports from District No. 3 of trans-mountain diversions are more accurate than reports from any other Colorado district, only casts a reflection upon the reports from other districts, as the Record shows, without contradiction, that these District No. 3 records are incomplete, furnished by inexperienced employees of the appropriators, not under the supervision of any Colorado official, and the information which these employees furnish to the water commissioner by telephone constitutes the data from which the daily quantities are determined and the source from which the official record is made up.

Witness Tipton gives his description of the manner and conditions in which water emerging from the east portal of the Laramie-Poudre Tunnel passes through the Parshall Flume where the automatic register is supposed to be recording the volume of water passing over the crest of the

flume (Rec. p. 632), and at page 833 of the Record, he says that the water passes through the flume in a more or less uniform condition—passes over the crest of the flume in an absolutely regular manner. This witness refers to Defendant's Exhibit No. W-2 (Rec. pp. 1565-1570), being six photographs, and states that they show the conditions while the water is passing from the mouth of the Tunnel through the flume.

Complainant's Exhibit No. 100 (Rec. p. 1212B) is a series of six photographs showing the course of the Laramie-Poudre Canal where the water emerges from the throat of the Tunnel to the point where it passes over the crest of the Venturi flume and the testimony of witness Meeker (Rec. p. 920) describes these exhibits. At page 922 of the Record, are found Mr. Meeker's reasons why the Venturi flume, in his judgment, is not so located as to accurately record the volume of water passing through it. His observations are based upon actual tests and experience, in addition to which, the photographs show the actual conditions; while Mr. Tipton's observations are his deductions from what the photographs make apparent on the surface. The photographs do not disclose unbalanced velocities; this can only be determined by an actual test made by one qualified and equipped to perform that duty.

At pages 923-925 of the Record, is found the statement by witness Meeker to the effect that the adverse conditions existing at the east portal of the Tunnel for the accurate measurement of diverted water can be overcome at small cost by installing either a Venturi or a rectangular flume at the inlet canal at the west portal of the Laramie-Poudre Tunnel and his Exhibit No. 101 (Rec. p. 1212C), being three photographs to which he refers in his testimony (Rec. pp. 924, 925) regarding the advisability of measuring the diversions from the Laramie River to the Poudre River at the west portal rather than at the east portal of the Tunnel, corroborates his statements as to the difference in the physical conditions prevailing in that section of the diversion canal between the point of diversion from the Laramie River and the west portal of the Tunnel and those shown to exist at the east portal.

II

The West Side Collection Ditch

The West Side Collection Ditch is not specifically named in the amended Bill of Complaint, nor did any appropriation of water from Rawah Creek receive recognition in the former decree, and it is the contention of Complainant that the use of this ditch for the diversion of water from Rawah Creek is a new appropriation, not authorized by the former court decree (Complainant's Exhibit No. 84, Rec. pp. 1154-1160); that it has no connection with the Laramie-Poudre Tunnel appropriation which was recognized as having a right to divert not to exceed 15,500 acre feet of water annually from the headwaters of the Laramie River and the West Fork of the Laramie River in Colorado, which are the designated sources of water supply for the Laramie-Poudre Tunnel appropriation (Testimony of Mr. Coy for Defendant, Rec. p. 581), as Rawah Creek and other streams tapped by the West Side Collection Ditch are from two to six miles below the Laramie-Poudre Tunnel appropriation point of diversion (Testimony of Mr. Meeker, Rec. p. 322; Complainant's Exhibit No. 77, Rec. p. 1138) and their waters could not be diverted to the Cache la Poudre River without the operation of the newly constructed West Side Collection Ditch, which is now used to divert the Rawah Creek water and carry it through the Tunnel from the Laramie River Basin to the Cache la Poudre River.

Not until 1931 was a diversion of water from Rawah Creek to the Cache la Poudre River made and the water was commingled with the water taken from the headwaters and West Fork of the Laramie River under the Laramie-Poudre Tunnel appropriation. (Testimony of Mr. Moore, Rec. p. 593) The evidence is not conflicting as to the time when actual construction work was first commenced upon the West Side Collection Ditch or Lower Rawah Ditch. The actual construction was commenced prior to 1910 in pursuit of the purpose to construct a system of ditches to collect the waters of various streams tributary to the Laramie River under separate appropriations, although each proposed appropriation was to be a part of the Laramie-Poudre project. (Testimony of Mr. Meeker, Rec. p. 323)

The West Side Collection Ditch or Lower Rawah Ditch, as now constructed as an independent entity (Testimony of

Mr. Coy, Rec. p. 581), is the consummation of a purpose to divert the waters of Rawah Creek and other tributaries of the Laramie River emptying into it below the point of diversion of the Laramie-Poudre Tunnel appropriation after the original and, also, the second proposed plan of diverting the water of this stream had lapsed for more than twenty years. (Testimony of Mr. Coy, Rec. pp. 580-582)

There is some conflict in the evidence on the question of whether or not the present ditch, as constructed, is located upon the original survey. The witnesses of Complainant testified that the constructed ditch includes about one mile of new construction on a 1929 survey in addition to that called for in the original plan and survey (Testimony of Mr. Meeker, Rec. p. 324), while the witnesses of the Defendant testified that there has been no change in the location. The right-of-way location and amended right-of-way location maps (Defendant's Exhibit No. J, Rec. p. 1403) support the statements of Complainant's witnesses and indicate clearly that a change was made in the right-of-way location, which change called for an extension of the right-of-way about one mile beyond the original terminus. See testimony of Mr. Meeker (Rec. pp. 926, 927) where he states that the map (Defendant's Exhibit No. J, Rec. p. 1403), showing the amended location of the right-of-way extending the same about one mile, was not approved by the Secretary of the Interior until May 5th, 1924; also, testimony of Mr. Meeker (Rec. p. 324) relating to the West Side Collection Ditch or Lower Rawah Ditch as of 1913 and as completed in 1931.

Complainant's Exhibits No. 78 (Rec. p. 1140), No. 79 (Rec. p. 1141) and No. 80 (Rec. p. 1142) are convincing proof that only incompleted sections of the ditch were constructed prior to 1913. Complainant's Exhibits Nos. 6, 7, 8 and 9 (Rec. p. 986) show construction work in progress in 1929 across the floor of the Laramie River Valley in the construction of the West Side Collection Ditch; Complainant's Exhibits Nos. 78, 79 and 80 (Rec. pp. 1140-1142) show the character and state of construction work on the ditch in 1913.

The Lower Rawah Ditch is separate and independent, having no connection with the right of the Defendant to divert not to exceed 15,500 acre feet annually of the water of the Laramie River under the appropriation from the headwaters of the Laramie River and West Fork of the Laramie River

and tributaries above the point of diversion of the Laramie-Poudre Tunnel appropriation (Complainant's Exhibit No. 84, Rec. p 1155), recognized as an appropriation junior to the Wyoming appropriations in the former decree. This appropriation is separate and distinct from the Laramie-Poudre Tunnel appropriation, having its separate adjudication, quantity and source of supply (Complainant's Exhibit No. 84, Rec. pp. 1155-1160), and the right to use the Lower Rawah Ditch for the diversion of Rawah Creek water as shown by the adjudication decree, was conditioned that it be shown in a proper proceeding that it has been completed and water has been diverted and applied to the irrigation of lands within a reasonable time. (Rec. p. 1160)

The ditch was not constructed until 1931. There was no construction work between 1913 and 1930. It is not a recognized appropriation. It is an unlawful diversion which interferes with the right of Wyoming to obtain and use the waters of Rawah Creek and other tributaries of the Laramie River, appropriated by Wyoming users, and to which she is entitled after the recognized appropriations, including the Laramie-Poudre Tunnel appropriation from the headwaters of the Laramie River and the West Fork and tributaries, have been satisfied.

Mr. L. C. Moore testified (Rec. p. 593) that 13,000 acre feet of water were delivered to the Tunnel through the Lower Rawah Ditch in 1932. Rawah Creek is not a tributary of the West Fork of the Laramie River, nor of the Laramie River above the diversion point of the Laramie-Poudre Tunnel appropriation, and the water diverted therefrom is not subject to diversion under the Laramie-Poudre Tunnel appropriation which was recognized in the former modified decree.

The Defendant states this diversion to be authorized and legal as coming within the right of Colorado to divert through the Tunnel, 15,500 acre feet of water annually, construing the former decree to give the right to Colorado to resort to any means found desirable or necessary to secure, for diversion through the Tunnel, the stated amount annually; that this Honorable Court, in the former decree, recognized the right of future appropriations at any time and from any source to the extent of 15,500 acre feet annually.

It is Complainant's position that the determination of the relative rights of the States of Wyoming and Colorado were established by giving recognition to the then existing appropriations in both states in the order of their respective priorities, modifying the rights under the Wyoming appropriations to amounts determined by the Court to be sufficient for the proposed use as shown from the evidence, thereby leaving for the Colorado Laramie-Poudre Tunnel junior appropriation, 15,500 acre feet of water from the headwaters of the Laramie River, the West Fork and tributaries. (Modified decree, 260 U. S. 1, 66 L. Ed. 1026)

The appropriation of the Laramie-Poudre Tunnel, independent of any connection with the Laramie River System, was limited by the decree of this Honorable Court to the amount of 15,500 acre feet of water annually to be taken from the headwaters of the Laramie River and the West Fork of the Laramie River (See Wyoming vs. Colorado, 259 U. S. 489, 490; 66 L. Ed. 1023), and the source of supply was so limited in the findings of the Colorado District Court in the decree rendered in the adjudication proceedings. (Complainant's Exhibit No. 81, Rec. p. 1145; Complainant's Exhibit No. 82, Rec. pp. 1147-1149)

The Tunnel, as an agency of the contemplated Laramie River System, was not intended to appropriate any water, but to receive and carry the water appropriated by all the various separate appropriations composing the project. (Complainant's Exhibit No. 82, Rec. p. 1147) The Court, 259 U. S. 496, 66 L. Ed. 1026, refers to this junior appropriation in Colorado as being entitled to take 15,500 acre feet. There never has been more than one appropriation recognized by the United States Supreme Court decree of June 5th, 1922, that can divert through the Tunnel.

In the determination of the relative rights of the contending states to the use of waters of the Laramie River and tributaries, the Court recognized existing appropriations as the yard stick of measurement upon which to establish these relative rights and, except as Wyoming appropriations were modified as to quantity necessary for the purpose of the appropriations, the determination of these rights was made upon the basis of existing and recognized appropriations; and while the aggregate of these recognized Colorado appropriations indicates the total amount of water that can be

diverted from the Laramie River in Colorado, each of these recognized appropriations is limited with reference to the point of diversion and means of conveyance, as well as to the volume authorized.

Colorado's right of appropriation and diversion does not permit her, if the source of supply designated in the appropriation proves insufficient, to effect entirely new and additional appropriations and, after a period of more than twenty years, to be permitted to take the waters of other streams, in whole or partial substitution for the original source of supply named in the appropriation or in addition thereto. The necessary amount of water to satisfy the recognized Colorado junior appropriations was not, by the decree, guaranteed, even though the Court did recognize the fact that an advantage was given Colorado in being able to obtain the full measure of water allocated to her appropriations, as they would be satisfied from the headwaters of the river while Wyoming could only enjoy what eventually came down from Colorado into Wyoming.

Colorado's recognized appropriations cannot be satisfied by permitting Colorado to gather the water where she will by constructing new canals that will capture the water of the tributaries of the Laramie River many miles below the diversion points of recognized Colorado appropriations and carry it back up the valley to the west portal of the Tunnel for trans-mountain diversion. It would only require an extension of this process to capture every cubic foot of water in any tributary of the Laramie River in Colorado and return it to the Tunnel for trans-mountain diversion to the Cache la Poudre River.

There is no appropriation to the Laramie River System. Complainant's Exhibit No. 82 (Rec. p. 1[illegible]7), "In the Matter of the Adjudication of Priorities of Water Rights in Irrigation District No. 48," (being the Laramie River District) shows under proceeding designated "No. 76" (Rec. p. 1149), "*The Laramie River Tunnel of the Laramie River System,*" that the Laramie River Tunnel appropriation is a single unit of the Laramie River project or system and derives its supply of water from the Laramie River and the West Fork of the Laramie River and all tributaries of each of said streams entering the same above the point of diversion through the Tunnel.

—III—

The Meadow Land Diversions

In paragraph Thirteenth of the Bill, in subdivisions 1 to 4, inclusive, (Rec. pp. 37, 38) Complainant alleges excess diversions of the Laramie River water for the irrigation of Colorado meadow lands and the irrigation of acreage in excess of 4,250 acres. In support of these allegations, Complainant produced the annual official field books of the water commissioner, R. A. Mosier, of District No. 48, State of Colorado, being official records in the office of the State Engineer of Colorado. The contents of these records are referred to in the testimony of Mr. Meeker (Rec. pp. 304-318) and for the years 1926 to 1932, inclusive, these official public records show the following:

Year	Acres Irrigated	Acres Natural Hay Land	Acres cut for hay	Total Diversions of water a. f.	Page Reference to Record
1926	8,311	6,425		62,787.6	306
1927	8,076		5,972	54,151.0	307
1928	8,266		5,622	56,279.2	308
1929	8,436		5,947	58,773.8	310
1930	6,517		6,170		312
1931	7,710		6,291	39,183.0	314
1932	7,000	about	4,250	36,869.3	316
			(a. meadow lands)		

The above information constitutes what the official records in the office of the State Engineer of the State of Colorado, compiled by the official water commissioner in charge of Water District No. 48, State of Colorado, show as to quantities diverted during the years from 1926 to 1932, inclusive, through the meadow land ditches for the irrigation of Colorado meadow lands. (Testimony of Mr. Meeker, Rec. pp. 306-317)

The reliability of this information is challenged by Defendant. The water commissioner, Mr. Mosier, who made the records and verified the same, when called as a witness for Defendant, testified with reference to these records (Rec. pp. 537, 538, 544, 545) that the annual field reports, all verified by him as to acreage irrigated, are not accurate or reliable as to acreage irrigated (Rec. p. 544), but as to the volume of water diverted, are not disputed.

Much evidence was produced by Defendant relating to the method of irrigating the meadow lands by a so-called "flooding system", defending the legality of this method regardless of the amount of water diverted at the headgates of the ditches, contending that this manner of diversion and use did not deplete the available quantity of water for Wyoming by more than 4,250 acre feet and that such diversions were within the terms of the decree fixing the amount of water that Colorado could lawfully use in the irrigation of the meadow lands under the term, "divert and take from the river," placing a construction on these words in the modified decree (260 U. S. 1, 66 L. Ed. 1026) to the effect that this was an authorized consumptive use and that quantities in excess of 4,250 acre feet of water might lawfully be diverted from the natural channel of the stream to accomplish the consumption of the 4,250 acre feet. (Testimony of Mr. Hinderlider, Rec. pp. 411-414) This challenge to the limitation placed upon Colorado diversions for the irrigation of the meadow lands under the former decree, as construed by the United States Supreme Court in the case at Bar, is an effort to re-litigate a question which passed into final determination in the former case and cannot again be submitted for consideration in a cause between the same parties. (See Opinion in this case of May 31st, 1932, 286 U. S. 494, 507; 76 L. Ed. 1245, 1251)

The right of the State of Colorado to appropriate of the available water in the natural channel of the Laramie River in Colorado for the irrigation of meadow lands, 4,250 acre feet annually, was recognized in the decree entered in the former suit and in paragraph First of Defendant's answer herein (Rec. p. 52), Defendant admits her right to irrigate the Colorado meadow lands by water taken from the Laramie River to be so limited.

Complainant does not deny that the so-called "flooding system", as testified to by Defendant's witness, is a proper method of irrigating meadow lands; but Complainant does deny that Defendant can divert and take from the Laramie River and its tributaries in Colorado for the irrigation of the Colorado meadow lands, more than 4,250 acre feet annually, measured at points of diversion. This is the only controversial question relating to the meadow land appropriation for determination in this action by this Honorable

Court—to rule as to whether the words "divert and take" mean "to consume", as Defendant now contends, or means to take away from the common source of supply without reference to whether any portion of the diverted quantity ever returns to the channel of the stream.

The Record is free from controversy and is to the effect that the volume of water diverted from the Laramie River and its tributaries in Colorado for the irrigation of the Colorado meadow lands, is not measured at all. (Testimony of witness Mosier, Rec. p. 535; Testimony of witness Watson, Rec. pp. 190, 191) The practice that has prevailed as the method of irrigating these meadows is to permit the appropriator to divert unlimited and unmeasured quantities of water from the natural channel of the stream or common source of supply and permit this diverted water to meander over the surface of the meadow lands, a great portion of such water being never beneficially used (Testimony of witness Mosier, Rec. p. 534), the unused portion thereof eventually returning to the thread of the stream and either passing on down for Wyoming use or being again diverted for the irrigation of meadow lands located below the point of return. The only issue is whether there have been diversions of water for the irrigation of the meadow lands in excess of the amount authorized by the former decree to be legally taken for that purpose.

Wyoming's contention is that the diversions should be limited to 4,250 acre feet, headgate diversion; Colorado's contention is that her right to divert is unlimited, so long as she does not, by her taking of the water of the river for the irrigation of meadow lands, finally consume any portion of the common supply in excess of 4,250 acre feet. The answer to these questions is whether the decree in the former case intended to permit the measurement of this appropriation on the basis of consumptive use or on the basis of headgate diversion.

There is evidence of a substantial character showing a pronounced increase in the acreage of meadow lands being irrigated in Colorado with water taken from the Laramie River. (Testimony of Mr. Meeker, Rec. pp. 306-308; 894-904) Defendant's Exhibit No. I (Rec. p. 1402A) is a map prepared for Defendant by Mr. Downing, who testified (Rec. pp. 446-454) as to the purpose in making Defendant's Exhibit No. I

and the manner in which it was prepared, stating he was instructed to locate the intake, the end and intermediate positions of all ditches (Rec. p. 446); and at Record page 454, he states he did not see all the ditches, but from his observation, all ditches he saw appeared to be old, with no evidence of new work in the sections covered by his survey.

Mr. Meeker says the irrigated acreage is in excess of 4,250 acres. (Rec. p. 900) Mr. Downing says he did not visit or embrace in Defendant's Exhibit No. I (Rec. p. 1402A) the entire area and the only record Colorado had showing the meadow land acreage irrigated, was the official reports by the water commissioner of Water District No. 48, which, when accepted by Complainant as being correct, were immediately repudiated as to accuracy by the Defendant, State of Colorado, through the testimony of the official who made the reports under oath for the Defendant; and to establish the inaccuracy of the reports, Mr. Downing made a survey of a section of the Laramie River Valley in Colorado and testified that the map, Defendant's Exhibit No. I, shows a total of 4,234.5 acres as all the land he has classified as irrigated — sage brush, pasture and meadow lands. (Rec. p. 448) Although Mr. Downing does not unqualifiedly state that the total irrigated acreage is 4,234.5 acres, Mr. Meeker states positively that the irrigated acreage exceeds 4,250 acres and the official annual field book reports give the irrigated acreage as approximately 8,000 acres.

—IV—

The Skyline Ditch Appropriation

The complaint, with reference to the appropriation diverted through the Skyline Ditch, is that the full quantity of diverted water is not recorded; that the official records kept by the State of Colorado are not reliable in that these records do not disclose the actual amount of water diverted. The evidence on the question of the reliability of the Skyline Ditch records is not free from conflict as to the quantity diverted.

The testimony of the witness Meeker for Complainant (Rec. pp. 250-257), together with the information disclosed in Complainant's Exhibit No. 41 (Rec. p. 1009), indicates that a substantial volume of water—1,633 acre feet—was di-

verted via the Skyline Ditch in 1926, which was not reported by the water commissioner of Water District No. 3 in the State of Colorado, being the water district receiving the diversions from the Laramie River in Water District No. 48, and Colorado, prior to 1932, never attempted to regulate or limit Skyline diversions. (Testimony of Mr. Kluver, Rec. pp. 606, 607)

Defendant's witness Tipton testified that 4,458 acre feet are shown on the automatic gauge height charts for the period from June 6th to 26th, 1926, and said (Rec. p. 841) that in his opinion, in general, the charts for the Skyline Ditch are sufficiently complete and accurate for the determination of the discharge of the diversions from the Laramie River. Complainant's witness Meeker stated (Rec. p. 252) that 4,501 acre feet was the amount diverted as disclosed by the gauge height charts for the same period. The statement of Mr. Meeker (Rec. p. 252) that the amount shown by the water commissioner's report for the same period is in the amount of 2,868 acre feet, leaving a difference of approximately 1,633 acre feet between the quantity reported by the water commissioner's report and the amount shown on the gauge height charts (Complainant's Exhibit No. 41, Rec. p. 1009), is not controverted.

The measuring device installed for the recording of water diverted via the Skyline Ditch is not operated during the full time that water is being taken via the Skyline Ditch from the Laramie River. See testimony if witness Drummond for Complainant (Rec. p. 168) that at the time the Skyline Ditch was being opened up for early diversion in the spring of 1928, the automatic gauging device was not in operation; and the testimony of Mr. Patterson for Defendant (Rec. pp. 716-719) indicates that the automatic gauge on the Skyline Ditch operated only a portion of the time that water was being diverted in the years 1922 and 1932, and the Defendant, in an effort to determine the exact amount diverted by the Skyline Ditch for the years 1922 to 1932, inclusive, relies upon the opinion of the witness Patterson, who had never personally observed the diversions during the years in question and prior to June 10th, 1933, (Rec. p. 734) on which date he made an observation and obtained information from records furnished him by Colorado, but possessed no actual knowledge that such diversions occurred. He

did not consult and use all the available records in connection with his study, which forms the background for his opinion as to diverted quantities. (Rec. pp. 734-737)

The measuring device used to record diversions from the Laramie River via the Skyline Ditch, is operated under the personal supervision of an employee of the Colorado appropriators and the records made by such employee are private records kept by the appropriators, which are accepted by the Defendant and constitute the only available record of Skyline diversions. (Testimony of witness Kluver, Rec. pp. 605-607) Mr. Tipton testified at length and in detail (Rec. pp. 845-879) in explaining and attempting to defend the method used by Colorado in keeping the record of diverted quantities via the Skyline Ditch, the Tunnel and Sand Creek and, in general, his conclusions are an attempt to justify and approve the records of the State of Colorado, although he does admit that they are not complete as covering the full period of time in which diversions take place.

Complainant, in support of her allegations that the water diverted through the Skyline Ditch from the Laramie River, in addition to alleged excess diversions, is not accurately measured and reported, introduced her Exhibit No. 41 (Rec. p. 1009), which contains data compiled by Complainant's witness Meeker and taken from automatic gauge height charts recording diversion flow through the Skyline Ditch for a definite period stated in the exhibit in the year 1926, showing that 1,633 acre feet more were shown by the charts than the amount which was reported by the water commissioner of Water District No. 3 during the same period of time. The discrepancy in these two sources of information, as shown by the witness Meeker, is an established fact and sustains Complainant's contention that no accurate measurement is made, no matter which one of these records, if either, is correct or if they are both erroneous.

Defendant has admitted excess diversions by the Skyline Ditch, but contends that Wyoming rights have not been encroached upon as a result of either excess diversions or inaccurate measurements, inasmuch as the total diversions from the Laramie River watershed to the Cache la Poudre River have not in any year in question, exceeded the aggregate quantity which Colorado contends she is entitled to take and may take by any means convenient to her. In her

words, she was, in the former decree, allocated an aggregate quantity of water which could be taken and diverted legally through one or as many separate diversion works and through as many individual appropriations as she chose to recognize. (Testimony of Mr. Hinderlider, Rec. pp. 412, 413)

To sustain the logic of Colorado's contention on this point, she has been forced to advance her consumptive use doctrine as to the meadow land appropriation (Testimony of Mr. Hinderlider, Rec. p. 414), as the Record discloses, without controversy, that in each year it is the custom and practice to divert for the irrigation of the meadow lands in Colorado, headgate quantities, more than 50,000 acre feet of water annually. (Rec. pp. 306-316) If the doctrine of consumptive use measurement is not sustained in determining the present controversy, the doctrine of mass allocation would lead the Defendant to an embarrassing position, as the total diversions shown to take place, in the aggregate, would amount to more than 75,000 acre feet instead of 37,250 acre feet, exclusive of diversions from Deadman Creek.

—V—

The Bob Creek Ditch, Columbine Ditch and Lost Lake System

The Bob Creek Ditch, Columbine Ditch and Lost Lake System will be considered together, as they all present the same proposition.

The construction and effect of the modified decree in the former suit, as reviewed and construed in the opinion of May 31st, 1932, supra, relative to the rights of the two states to divert and use the waters of the Laramie River and its tributaries, and Defendant's admissions in paragraph First of her answer (Rec. p. 52) as to the allocation of available supply to the recognized Colorado appropriations as determined in said former decree, should eliminate the necessity of giving consideration to the defense that the Defendant, State of Colorado, now relies upon as a justification for her recognition of these diversions, i.e., that mass allocation was the purpose of the former decree; that all diversions recognized as legal and authorized under Colorado laws can legally appropriate and divert Laramie River water. (Testimony of State Engineer Hinderlider, Rec. pp. 411-413, 417, 818)

Each of the recognized appropriations is, as stated in Defendant's answer and as shown in the evidence, demanding the full amount of its appropriation. The Defendant has exhibited no purpose to surrender any portion of the quantity of water allowed to any recognized appropriation to enable a supply to be made available for the Bob Creek Ditch, the Columbine Ditch, or the Lost Lake System.

As to the Bob Creek Ditch appropriation, the Columbine Ditch appropriation and the Lost Lake System appropriation, Defendant again desires to re-litigate a question which has been finally determined. If these ditches and lake reservoir system existed at the time of the determination of the relative rights of these two states based upon existing appropriations, it must be assumed that they were considered in such determination and, not being recognized in the former decree as having rights to appropriations from the available supply, the Court, after determining the available annual flow to satisfy all appropriations in both states, determined the relative rights of the two states by allocating to each appropriation in the State of Colorado that obtained recognition in said proceeding, a stated quantity of water to be obtained by and through existing, designated ditches, leaving the remainder of the available water supply to the State of Wyoming. Whether that remainder should be less or more than the 272,500 acre feet which the Court determined would be available to Wyoming users if reasonable storage be provided to capture the total available remaining annual supply, is now immaterial, as both states are bound to respect the decree. (Wyoming vs. Colorado, 259 U. S. 485; 66 L. Ed. 1021) Any encroachment by Defendant on Complainant's right to enjoy the remaining quantity of water is an injury to Complainant.

The contentions of the Defendant as to the Bob Creek Ditch, the Columbine Ditch and the Lost Lake System, cannot now recieve recognition. Such diversions are illegal and in violation of the decree in the former suit and are against the equitable rights of the State of Wyoming to appropriate and use the water remaining after the recognized Colorado appropriations are satisfied. (Opinion, 286 U. S. 501; 76 L. Ed. 1248)

Complainant's Exhibit No. 16 (Rec. p. 989) is a letter from C. C. Hezmalhalch, chief clerk in the office of the State Engineer of Colorado, written in 1923, wherein Mr. Hezmal-

halch admits that the Laramie and Lost Lakes are in the Laramie River watershed and not subject to appropriation on account of the Wyoming-Colorado water suit. See, also, Complainant's Exhibit No. 17 (Rec. p. 989) wherein it is stated that no decrees have been awarded to either the Lost Lake or Laramie Lake.

"If no further opinion is handed down by the Supreme Court with reference to Bob Creek and Columbine Ditches, we would use it." Testimony of Roy A. Portner. (Rec. p. 612) (Testimony of Mr. Hinderlider, Rec. p. 816) These ditches are capable of diverting, and do divert and take away from Wyoming, substantial quantities of water. (Rec. pp. 610, 611)

—VI—

The Wilson Supply Ditch

In the modified decree of October 9th, 1922, entered in the original proceeding, is the following proviso (260 U. S. 1, 66 L. Ed. 1026):

> "* * * this decree shall not * * * prejudice the right of the state of Colorado, or of anyone recognized by her as duly entitled thereto, to continue to exercise the right now existing and hereby recognized to divert and take from the headwaters of Deadman Creek, a Colorado tributary of the Laramie River, the relatively small amount of water appropriated therefrom prior to the year 1902 by and through what is designated in the evidence as the Wilson Supply Ditch; nor prejudice or affect the right of the State of Colorado or the State of Wyoming, or of anyone recognized by either state as duly entitled thereto, to continue to exercise the right to divert and use water from Sand Creek, sometimes spoken of as a tributary of the Laramie River, in virtue of any existing and lawful appropriation of the waters of such creek."

The controversy presented in the case at Bar involving the question of the right of Colorado to divert and take from the headwaters of Deadman Creek that relatively small amount of water appropriated therefrom prior to 1902 by and through the Wilson Supply Ditch, hinges upon whether there was an existing appropriation of water from the headwaters of Deadman Creek prior to 1902 and, if such appro-

priation had in fact been made, then what was the relatively small amount of water that had been appropriated from the headwaters of Deadman Creek prior to 1902? There is no available record that Complainant can find, nor any evidence produced by Defendant, showing what that relatively small amount of water was.

The United States Supreme Court, in determining the relative rights of the States of Colorado and Wyoming, recognized existing appropriations with priorities controlling the order of recognition, found the available water supply needed to satisfy these appropriations and made an allocation thereof to each of the two states.

The Wilson Supply Ditch, also called "Sand Creek Ditch System," "Divide Ditch," or "Deadman Ditch," (Testimony of witness Fleming, Rec. p. 91) shown on the plat, Complainant's Exhibit No. 5 (Rec. pp. 983, 984A; also, Defendant's Exhibit No. J-1, Rec. p. 1496B), which Exhibit No. 5 is the statement of claim for the Wilson Supply Ditch, used now to appropriate and divert the waters from the headwaters of Deadman Creek, was not in existence in 1902. Witness Eaton testified (Rec. pp. 642, 658-666) that Deadman Ditch (which is the same as the Wilson Supply Ditch) was built in the summer of 1902 and after water was running therein, they continued building on up to the next creek, but did not reach the next creek until the summer of 1903. Further testimony to support Complainant's contention that no water was appropriated from the headwaters of Deadman Creek via the Wilson Supply Ditch prior to 1902 is unnecessary; however, the testimony of Mr. Eaton is fully corroborated by witness Fleming (Rec. p. 89) and Complainant's Exhibit No. 1 (Rec. p. 957); witness Olson (Rec. pp. 136, 137); Complainant's Exhibit No. 2 (Rec. p. 971); witness Worster (Rec. pp. 95-99); witness Williams (Rec. pp. 100, 101); witness Lundquist (Rec. pp. 101, 102); and witness Wurl (Rec. p. 108).

The Wilson Supply Ditch is used to capture the waters of other sources than the headwaters of Deadman Creek. (Testimony of witness Watson, Rec. pp. 184, 185) The Sand Creek Ditch System or Wilson Supply Ditch was not completed prior to 1902. (Testimony of witness Fleming, Rec. pp. 87-89; Complainant's Exhibit No. 1, Rec. pp. 958, 965-969) Water was first diverted through that section of the Divide Ditch connecting Sand Creek with Sheep Creek on or about May 9th, 1902.

The decree for the Sand Creek Ditch System appears in the Record at pages 664 and 665; the findings upon which the decree is based appear in the Record at pages 663 and 664, where the Court found (Rec. p. 664) that claimant was entitled, by appropriation, to the use of water from named streams, to Priority Number 38, by construction. No determination of any definite quantity of water was therein decreed or adjudicated as having been appropriated from the headwaters of Deadman Creek. The conditional adjudication to the Sand Creek Ditch System is Defendant's authority for diversion of water from the headwaters of Deadman Creek, but the validity of the diversion is, under the terms of the former modified decree, dependent upon an appropriation made prior to 1902. The Record does not show that an appropriation from Deadman Creek has yet been made in compliance with the laws of Colorado.

The Record in the case at Bar shows that, in a special proceeding, the date of priority for the Sand Creek Ditch System was fixed as June 15th, 1899, but an appropriation of a stated quantity of water from the headwaters of Deadman Creek has not been determined or adjudicated and no measurement or record of the quantity of water diverted from the headwaters of Deadman Creek was made. (Testimony of witness Drummond, Rec. pp. 173, 174) The specific language of the decree is,

> " * * * that there be allowed to flow into said ditch from said streams, for the use and benefit aforesaid, under and by virtue of said appropriation by construction, Priority Number thirty-eight, two hundred and eighty-eight cubic feet of water per second of time, or so much thereof as may be necessary to irrigate fifty thousand acres of land, * * *."
> (Rec. pp. 664, 665)

There are no findings in this proceeding of facts to show that an appropriation of water had been made. The date of priority, June 15th, 1899, is definitely fixed; nothing more.

The decree says there shall be allowed to flow into the Sand Creek Ditch System, 288 cubic feet of water per second of time. The point of diversion is not designated. The decree is not grounded upon any finding of actual diversion and application to beneficial use of any quantity of water, while the statement of claim for the Wilson Supply Ditch

(Complainant's Exhibit No. 5, Rec. p. 984) has a stated maximum carrying capacity of only 117 cubic feet of water per second of time for that part of the ditch between Deadman Creek and Sand Creek.

The appropriation from the headwaters of Deadman Creek is claimed by Defendant to have been made earlier than 1902 by application of the doctrine of relation. There is no contention on the part of Colorado that water was taken from the headwaters of Deadman Creek prior to 1902, her position being that under the doctrine of relation, because the survey for the Divide Ditch was commenced in 1897 and actual construction work on that section of the ditch between Sheep Creek and Sand Creek, called the "Divide Ditch," was commenced prior to 1902, that thereby, Colorado now has a right under the terms of the modified decree, to appropriate and take, under the Sand Creek Ditch System appropriation, 288 cubic feet of water per second of time with priority date June 15th, 1899, from tributaries of the Laramie River, including Columbine Creek and its tributaries, Deadman Creek and its tributaries and Sand Creek and its tributaries. The decree in the former case, as modified, does not establish such right. The source from which the relatively small amount was to come, was specifically stated as the headwaters of Deadman Creek. Prior to 1902, there had never been an appropriation of water from the headwaters of Deadman Creek.

Defendant seeks to establish the existence of the Deadman Creek appropriation prior to 1902 by relying upon the doctrine of relation for its date of priority by reason of construction commencing prior to 1902 upon a ditch to divert water from another independent stream—Sand Creek—of which Deadman Creek is not a natural tributary (259 U. S. 489) nor located in the same watershed. Colorado does not claim water had been actually appropriated by diversion from the headwaters of Deadman Creek prior to 1902. The Supreme Court of the United States, in the former modified decree, authorized the taking by Colorado in the future of only that relatively small amount of water from the headwaters of Deadman Creek which had been appropriated prior to 1902 and the uncontradicted testimony is that no quantity of water had been diverted and taken from the headwaters of Deadman Creek prior to 1902.

The construction of the section of the Sand Creek Ditch System known as the Divide Ditch in 1901, connecting Sand Creek with Sheep Creek, or the actual diversion of Sand Creek water through that ditch in 1902 from Sand Creek into Sheep Creek, has no connection with the later diversion of water from the headwaters of Deadman Creek. The date of priority for the Deadman Creek appropriation is wholly immaterial. If any quantity of water was diverted and taken from the headwaters of Deadman Creek by Colorado prior to 1902, diversions in like quantity can be continued. If no appropriation was made prior to 1902, none could after said date be lawfully made under the court decree as modified.

There is no occasion to seek a determination of relative rights to the use of the water of Deadman Creek as between Wyoming and Colorado. Such rights were finally determined in the former modified decree, as Deadman Creek is a natural tributary of the Laramie River. Its flow constitutes a portion of the available annual supply which was allocated between Colorado and Wyoming in the former case. Under the decree, there could be no increased diversions after 1901 over what was actually appropriated by a diversion and taking prior to 1902.

Witness Drummond testified the Wilson Supply Ditch has been enlarged (Rec. p. 176), and witness Watson testified that a program of enlargement has recently, prior to 1929, been initiated to increase the size of the Wilson Supply Ditch. (Rec. pp. 185-188) See, also, Complainant's Exhibits No. 11 to No. 15, inclusive, (Rec. pp 988A to 988E) being photographs of conditions of portions of the Wilson Supply Ditch.

The District Court of Larimer County, Colorado, under date of October 6th, 1906, adjudicated to a ditch, Number 36, named "Sand Creek Ditch System," drawing its supply of water from Columbine Creek, Deadman Creek and Sand Creek and their tributaries by means of ditches formerly known as Columbine Ditch, Deadman Ditch, the channel of Sand Creek and a ditch connecting Sand Creek with Sheep Creek, whereby all the waters of the system are discharged into the Cache la Poudre River, the Court stating that the Sand Creek Ditch System was entitled to the use of the waters from said streams, by appropriation, to Priority Number 38, *by construction thereof*, to the quantity of 288

cubic feet of water per second of time with date of priority June 15th, 1899. (Defendant's Exhibit No. G, Rec. pp. 1262-1267) There is not in the Record, nor could Complainant find any record of an adjudicated right for an appropriation of the headwaters of Deadman Creek in any stated quantity for any stated purpose. The appropriation adjudicated to the Sand Creek Ditch System is relied upon by Defendant, Colorado, as constituting an appropriation of water from the headwaters of Deadman Creek.

—VII—

Water Supply

The primary right of the Complainant, which it is alleged is being violated by the Defendant and, if permitted to continue, will increase the injury to Complainant, is the taking by Colorado from the Laramie River and tributaries of more than the quantity of water to which she is entitled under the decree in the former case wherein the relative rights of these two states and of all users under the laws of either state to the use of the waters of the Laramie River and tributaries, were determined, except as to Sand Creek. It is alleged in paragraph Twentieth of the Bill (Rec. pp. 46, 47) that this available water supply will be, by said unlawful diversions made by the Defendant, if permitted to continue, gradually reduced and finally consumed.

The right of Wyoming in the use of the waters of the Laramie River and tributaries is not based upon any definite annual quantity. It may be more than 272,500 acre feet in a given year or successive years, or it may be less than this quantity; and when a shortage of water supply exists by reason of insufficient precipitation or snowfall upon the Laramie River watershed, Wyoming can make no just complaint against the recognized Colorado appropriations taking their full appropriations when water is available therefor, as awarded to them under the decree, and can claim only the remaining water after these recognized Colorado appropriations, including the 15,500 acre feet for the junior Laramie-Poudre Tunnel appropriation, have been satisfied from the authorized sources of supply. (259 U. S. 485, 66 L. Ed. 1021)

The Court recognized the position of Wyoming with relation to Colorado in the ability of the two states to satisfy the recognized appropriations when it said:

> "The water to satisfy the Colorado appropriations is, and in the nature of things must be, diverted in Colorado at the head of the stream; and because of this those appropriations will not be affected by any variation in the yearly flow, but will receive their full measure of water in all years. On the other hand, the Wyoming appropriations will receive the water only after it passes down into that state, and must bear whatever of risk is incident to the variation in the natural flow." (See Wyoming v. Colorado, et al., 259 U. S. 419, 485; 66 L. Ed. 999, 1021)

With Wyoming being entitled only to the remainder of water available after the recognized Colorado appropriations have diverted their full measure each year, a diversion by any of the recognized Colorado appropriations in excess of authorized quantities, or a diversion of water in Colorado under an appropriation not recognized in the former decree, constitutes a direct encroachment upon the rights of Wyoming. Her interests in the available waters of this stream and tributaries have been determined and made to depend upon the seasonal supply available. She must have storage facilities available to obtain any benefit from high flow and she must sustain the injury caused by shortage without complaint if Colorado diversions to satisfy her recognized appropriations be held within their lawful limits.

In the former case, the Court found the entire supply of water available to satisfy Wyoming appropriations and the Laramie-Poudre Tunnel appropriation to be 288,000 acre feet (259 U. S. 488, 66 L. Ed. 1022); and, further, that of this quantity, there were available for the junior Laramie-Poudre Tunnel appropriation, 15,500 acre feet of water annually, the balance being necessary to satisfy existing Wyoming appropriations. (259 U. S. 496, 66 L. Ed. 1026) In determining the relative rights of these two states in the use of the waters of this stream, the Court recognized that the average yearly flow of all years could not be accepted as a proper or safe measure of the available water supply to satisfy the Wyoming appropriations that were senior in time to the junior Laramie-Poudre Tunnel appropriation.

The Court concluded that the natural and varying flow of this stream at Woods, which is after the recognized Colorado appropriations have been satisfied, is susceptible, by means of practical storage and conservation, of being converted into a fairly constant and dependable flow of 170,000 acre feet per year, but not more; that this dependable flow was 20,000 acre feet less than the annual average flow; that the average annual flow, so converted into a fairly constant and dependable flow by the means of storage, would be sufficient to satisfy Wyoming appropriation, and leave available for the junior Laramie-Poudre Tunnel appropriation, 15,500 acre feet annually.

To ascertain the relation in the average annual flow of the Laramie River during the period of 1923 to 1932, inclusive, at Woods, to the amount the Court determined should be the available water supply, studies were made by Elmer K. Nelson and Ralph L. Meeker for the Complainant, and by R. J. Tipton for the Defendant. The Nelson study, Complainant's Exhibit No. 35, (Rec. p. 1006), shows average or mean annual runoff at Woods Station to be, for the period in question, 149,960 acre feet of water; the Meeker study, Complainant's Exhibit No. 54 (Rec. p. 1060; Testimony of witness Meeker, Rec. p. 266), shows the average or mean annual runoff at Woods Station to be, for the same period, 150,000 acre feet of water.

Mr. Tipton states (Rec. p. 874) that the average water supply at Woods Station during the period from 1923 to 1932, is 150,200 acre feet annually; that during the period from 1925 to 1932, the mean flow passing Woods Station was 141,400 acre feet; (Rec. p. 874) also, that Colorado uses are increasing. (Rec. p. 868) The Meeker water discharge and supply studies, Complainant's Exhibits No. 42 to No. 54, inclusive, (Rec. pp. 1009-1060) show a careful, competent and exhaustive study by a qualified expert in their preparation and are the basis of Mr. Meeker's statement regarding present water supply being adversely affected by Colorado's excessive diversions. (Testimony of Mr. Meeker, Rec. pp. 260-267)

The average annual flow of the Laramie River at Woods Station for the period from 1923 to 1932, inclusive, is not in dispute. The Record shows this average annual flow at Woods is, approximately, during that period, 20,000 acre feet less annually than the Court found should be available

in the former case. The Record shows that the average flow at Woods Station during the past ten years has not equalled by 20,000 acre feet what this Honorable Court considered should be available by means of storage for Wyoming appropriations as a fairly constant and dependable flow.

If this shortage of water at Woods is the result of natural causes, Wyoming cannot complain; but with a condition prevailing as revealed by the Record—no accurate measurements of diverted quantities (Testimony of Mr. Meeker, Rec. pp. 250-252), many additional ditches being permitted to divert, the recognized ditches constantly taking more than their authorized annual appropriations and no effort being made to regulate or keep within the limits of the recognized appropriation for the meadow ditches (Testimony of Mr. Watson, Rec. p. 190)—it cannot be logically urged that the existing shortage is caused by natural conditions.

It is reasonable to contend that a prohibition of further use of the Bob Creek Ditch, the Columbine Ditch, the Lost Lake Reservoir System and a limitation of meadow land quantities by headgate diversion to 4,250 acre feet and a limitation of the Skyline Ditch diversion to 18,000 acre feet annually, the prohibition of diversions from Deadman Creek being taken by the Deadman Ditch and the accurate measurement of diverted water, will account for the loss that Wyoming has sustained during the immediate past years. See the testimony of Mr. Meeker (Rec. p. 910); testimony of Mr. Nelson (Rec. p. 236); and Mr. Tipton says there is no question but what some of the decreased flow is due to increased uses by Colorado users. (Rec. p. 868)

The Defendant has submitted a study by Mr. Tipton, who bases his conclusions upon comparative studies, largely of the Cache la Poudre River water supply over a stated period with the water supply of the Laramie River for a different period of time within the same years (Testimony of Mr. Meeker, Rec. p. 909), and from these conclusions thus obtained, this witness states that Wyoming has not experienced a shortage of water at Woods Station which can be charged to increased trans-mountain diversions in Colorado or to anything other than natural causes. (Testimony of Mr. Tipton, Rec. p. 868) The basis upon which Mr. Tipton had determined that Colorado has not been departing from the decree in the quantities diverted or in the number of ditches

permitted to divert, is an effort to bring down to date the study made in connection with the former Wyoming-Colorado case when a controlling issue was the determination of the actual flow and annual available flow of the Laramie River so that a division of the water between the two states could be made upon an equitable basis and, in that case, the question was finally settled.

At Record, page 858, Mr. Tipton points out that Mr. Meeker made a similar study or proceeded on similar lines in studying water flow many years ago. This does not establish any facts in favor of Defendant in this case. The Meeker study at that time was for the purpose of determining the flow then not established; at the present time, it has been determined so far as Colorado and Wyoming are concerned and is not a question for review.

A comparative study of annual water supply of the Cache la Poudre River and Laramie River was recognized in the former Wyoming-Colorado case (259 U. S. 479, 66 L. Ed. 1019) as admissible to aid in determining the water supply; but that question was there finally determined and the comparative studies now submitted by Colorado's witness Tipton are valueless. Mr. Meeker has stated the existence of those adverse conditions between these two stream flows which prompted The Honorable United States Supreme Court to reject such data as a reliable source of information in the former case when a comparative study properly prepared would have been helpful. (Rec. pp. 908-911)

The water supply or stream flow of other interstate streams during the same period is immaterial. The question at issue in the case at Bar is not to determine what the available supply is, but to determine if Wyoming is being denied any water that is available to which she is entitled under the former decree by reason of Colorado taking more than she is lawfully entitled to. The available water supply to meet the demands of both Colorado's recognized appropriations and Wyoming's appropriations is not now open to question. It was finally determined in the former case and Colorado's evidence on comparative stream flow studies of the Laramie River and other streams relates to a question that is wholly immaterial.

Mr. Tipton finds that the mean trans-mountain diversion from the Laramie River in Colorado by all Colorado users during the period from 1925 to 1932, including Sand Creek

diversions, was 28,040 acre feet; that this is 83% of 33,500 acre feet; and if the use by the meadow lands of approximately 4,250 acre feet is added to the trans-mountain diversions, the total use during the period of low flow water supply from 1925 to 1932 by Colorado users, was 32,390 acre feet, being 86% of 37,750 acre feet. (Rec. p. 874) These analyses come from a study based upon theories that have no material connection with determining what Wyoming is entitled to receive, or does receive, based upon the figure 154,500 acre feet at Woods. There is, likewise, no necessity for ascertaining the percentage relation of 28,040 acre feet of trans-mountain diversion to 33,500 acre feet.

Sand Creek diversions are, also, entirely foreign to the authorized diversions of 33,500 acre feet for the Laramie-Poudre Tunnel and Skyline Ditch appropriations and the further analysis to determine the relation of 28,040 acre feet of water, plus 4,250 acre feet, to 37,750 acre feet of water, on a percentage basis, involves both the element of actual trans-mountain diversion, determined by the use of inaccurate, questionable, part-time records and an illegal consumptive use of unknown amounts as a basis for meadow land irrigation, when the Record shows actual diversions during each of the years from 1926 to 1932, inclusive, for the irrigation of these meadow lands, greater in amount than the total authorized diversion in the State of Colorado for all uses; and this second analysis also embraces Sand Creek diversions which, except the relatively small amount (though wholly undetermined) to be diverted from the headwaters of Deadman Creek, constitute no portion of the quantity authorized to be taken from the Laramie River. The figures used are taken from the Colorado records which cover the months from May to September, inclusive, of each year only and are neither accurate nor complete for that period, plus an estimate of the amount consumed in meadow irrigation, with no allowance for unreported diverted quantities which the Record shows it is a common practice to divert in early and late periods of each year with no record or measurement made thereof.

The study does not indicate whether the amount of Skyline Ditch diversions used was based upon reports of the water commissioner of District No. 3, being 2,868 acre feet for 1926, or the amount shown by the automatic gauge charts for 1926, being 4,501 acre feet. To consider as reliable the

conclusions offered, one must accept at face value all records used by Mr. Tipton in his study, whether administrative reports of the water commissioner of District No. 3 or automatic gauge charts or both, supplemented by his estimates to fill in where there are no records, and this is asking too much from what the records disclose to have been the practice in compiling the same.

Automatic chart records are not complete and are, in most instances, read and reported by inexperienced individuals employed, not by the State of Colorado, but by appropriators of Laramie River water in Colorado, who phone their information to the water commissioner of the receiving district as the basis of distribution. There are no automatic gauge chart records available for the years prior to 1926 for the Laramie-Poudre Tunnel and none for the Skyline Ditch for the year 1922. All automatic gauge chart records of trans-mountain diversions from the Laramie River in Colorado were destroyed. Administrative reports do not include unreported diversions.

Mr. Tipton determined the relation of Colorado appropriations to Wyoming rights upon the basis of mass diversions which, with the use of arbitrary figures of (unauthorized) consumptive use measurement, is determined without the aid of any actual facts. (Rec. p. 874) The necessity of having in operation automatic recording gauges to measure the diversions from streams where they occur at high altitudes, is shown by the testimony of Mr. Meeker (Rec. pp. 245-249) and Complainant's Exhibits Nos. 37, 38, 39 and 40 (Rec. p. 1008).

The water commissioners are required to keep a record of the amount of land irrigated in their water districts, the character and acreage of crops grown and, in general, the total amount of water distributed in their districts each year for various uses. These records are tabulated and filed in the office of the State Engineer for permanent record. (Testimony of Mr. Hinderlider, Rec. p. 395) Water commissioners in Colorado are not authorized by law to make ditch ratings and measurements of water diverted by irrigation ditches. These officers determine the amount of water diverted by a ditch from an official rating card or rating table which they obtain from the office of the State Engineer. If they should not be furnished with such rating table, they would only be able to make estimates. They could not accu-

rately determine the amount of water diverted. No water user, owner, superintendent of canals or ditches or reservoirs has any authority to make official determination, under the law, of the amount of water diverted by the owner of the canal, unless he is deputized by the State Engineer to perform such service. (Testimony of Mr. Hinderlider, Rec. p. 400) This statement should be sufficient proof that the diversions from the Laramie River to the Cache la Poudre River through the Laramie-Poudre Tunnel and the Skyline Ditch are not reported or the records kept in an official or legal manner.

Mr. Hinderlider says (Rec. p. 401) that it is necessary, under the laws of Colorado, for water officials to make an accounting of trans-mountain diversions in order to protect those making such diversions so that they may take out of the Cache la Poudre River the proper amount of water, and that appropriators from the Cache la Poudre River may be protected against excessive or illegal diversions from the Cache la Poudre River; but such system of recording trans-mountain diversions from the Laramie River is not shown to be followed by those making trans-mountain diversions. If an accounting were made, it would not prevent the appropriators from the Cache la Poudre River from enjoying the use of all waters that flow from the Laramie River into this river that are not reported and treated, as Mr. McAnelly, the commissioner of District No. 3 in which the Cache la Poudre River flows, testified, as foreign water or just water belonging to the Cache la Poudre River and is, therefore, available for diversions by any Cache la Poudre appropriator. It is only the amount of water diverted from the Laramie River of which there is a record that has to be delivered to those who are entitled to have the use of the diverted water from the Laramie.

The appropriators constantly watch each other and continually watch the water officials having charge of the administration of such trans-mountain diversions, and naturally insist that the measuring and recording devices should be adequate and efficient and the records kept accurately. (Testimony of Mr. Hinderlider, Rec. p. 402) It may appropriately be surmised that the appropriators have to watch only each other in the matter of trans-mountain diversions from the Laramie River to the Poudre River. The appropriators are in charge of the diversion works. Their em-

ployees are the only ones supervising and making private records of such diversions and for their own use. (Testimony of Mr. Kluver, Rec. pp. 605-607) There is no water official to be watched because none come more than three or four times in a season, and then, only to make observations.

The fact that Mr. Hinderlider does not recall in nine or ten years ever having received a complaint from an appropriator from the Cache la Poudre River with respect to the accuracy and efficiency of the devices installed for measuring water diverted from the Laramie River to the Cache la Poudre River, would not indicate anything favorable to the efficiency of this system, because all of the unrecorded water —more than 3,000 acre feet in 1926, as Mr. McAnelly stated to Mr. Freeman (Rec. p. 148)—would be made available for the use of these Cache la Poudre appropriators and they would only be interested in being protected from excess diversions in the Cache la Poudre over what the Record shows was diverted from the Laramie. The tranquillity prevailing among the appropriators from the Cache la Poudre River in Colorado relating to trans-mountain diversions from the Laramie to the Cache la Poudre, their source of supply, would seem to indicate they have no objection to the method, now shown to exist, being continued.

For the Defendant, Mr. Tipton and Mr. Patterson each admitted, as has been pointed out elsewhere in Complainant's brief, that there are no complete records, official or otherwise, showing the total diversions during the years 1926 to 1930, inclusive; nor for the years preceding those dates; but this, they state, is of minor importance, because the quantities for the missing period of time can be supplied by estimates. Mr. Patterson and Mr. Tipton contend they are able to supply missing data and, thereby, make the chart records for the years 1920 to 1931 and 1932 for the Skyline diversion, the Tunnel and Sand Creek, sufficiently accurate to form the basis of a computation to determine diverted quantities during those years in the aggregate and as to each year.

This, in reality, is support for Complainant's position. It is not a question of whether, by supplementing available data through the skill and experience of experts on the question of measuring and determining diversion flows of water, but what kind of records does Colorado make that Wyoming has to rely upon to determine the amount of

trans-mountain diversions in the absence of the assistance of experts who feel qualified from their experience to supply the omissions? And what amount is diverted when there is no record made or pretended to be made of those quantities which are diverted as foreign water from the Laramie River, unrecorded, to the Cache la Poudre River to the advantage of the appropriators from the Poudre River, depleting the available quantity required for Wyoming in the exact amount that is thus unlawfully taken from the Laramie River?

—VIII—

The Relative Rights to Divert and Take the Waters of Sand Creek and Natural Tributaries by Appropriators Claiming Appropriations Acquired Under the Laws of Wyoming and of Appropriators Claiming Appropriations Acquired Under the Laws of Colorado.

The relative rights of Wyoming and Colorado appropriators in the use of the waters of Sand Creek were not determined in the former case. (259 U. S. 419, 487; 66 L. Ed. 999, 1022) Sand Creek is an interstate stream, flowing from Colorado into Wyoming, but it is not, except nominally, a tributary of the Laramie River. (See 259 U. S. 489, 66 L. Ed. 1023) Independent of the use made of the channel of Sand Creek to carry water which the Defendant now diverts from the headwaters of Deadman Creek to the point where it is again diverted from the main channel of Sand Creek to Sheep Creek, Colorado has diverted and permitted to be diverted, practically the entire flow of Sand Creek and natural tributaries through that portion of the Wilson Supply Ditch identified as the "Divide Ditch." (Bill, § 15th, Rec. p. 44; Testimony of witness Widman, Rec. p. 142)

Prior to 1899, many water rights had been acquired under Wyoming territorial law by appropriators from Sand Creek, giving the right to divert and take stated quantities of the natural flow of Sand Creek for the purpose of irrigation and other beneficial uses. These rights have since been continually enjoyed and made use of by the appropriators and their successors to the extent that water was available,

and the evidence of those rights as they were acquired and as they exist today under Wyoming law, appears in Complainant's Exhibit No. 85 (Rec. pp. 1160-1200), where are found certified copies of certificates of appropriation of water evidencing the existence of these Wyoming water rights, which show the following:

Name of Appropriator	Name of Ditch	Source of Water Supply	Date of Appropriation	Amount of Appropriation cu. ft. per s.
Wyoming Central Land & Improvement Co.	Gullihur No. 2	Sand Creek	1871	2.8
Id.	Braden Ditch	Sand Creek	1871	1.31
Id.	Nedarb Ditch	Sand Creek	1871	1.74
Id.	Red Ditch	Sand Creek	1871	1.4
Id.	Gullihur No. 1	Sand Creek	1871	1.69
Id.	Richards Ditch	Sand Creek	1871	3.57
James Hardman	James Hardman No. 2	Sand Creek	May, 1878	1.81
The Denver-Laramie Realty Co.	Gullihur No. 2	Sand Creek	1880	3.2
J. M. Hoge	Red Ditch	Sand Creek	1880	2.95
Id.	Gullihur No. 1	Sand Creek	1882	2.51
Peter Cunningham	LeRoy Ditch	Sand Creek	May, 1885	8.64
John Goetz	Davis Bros. No. 1	Sand Creek	May, 1885	3.65
The Denver-Laramie Realty Co.	LeRoy Ditch	Sand Creek	Spring, 1885	4.97
William Konold	William Konold	Sand Creek	April, 1886	4.57
Nicholas Lundquist	Konold Ditch	Sand Creek	April, 1886	1.11
F. B. Collins	Collins No. 4	Sand Creek	1887	.37
J. M. Hoge	Richards Ditch	Sand Creek	1888	.64
John Goetz	Lone Tree Ditch	Sand Creek	March, 1890	5.68
F. B. Collins	Collins Ditch	Sand Creek	1890	.79

Alice Hardman	Davis Bros. No. 2 & Alice Hardman	Sand Creek	August 8, 1891	4.57
J. M. Hoge	Lone Tree or Antelope Ditch	Sand Creek	March 17, 1894	5.85
Alice Hardman	Davis Bros. Sand Creek No. 2	Sand Creek	November 26, 1894	1.78
L. J. Bush	Bush No. 1	Sand Creek	July 24, 1897	2.28
John Goetz	Davis Bros. No. 2	Sand Creek	May 28, 1900	2.85
Diana Brown	Dry Creek No. 2	Dry Creek*	March, 1876	2.43
Id.	Dry Creek No. 1	Dry Creek*	April, 1876	2.02
A. H. Johnson	Antelope No. 3	Antelope Creek**	April, 1885	.64
Id.	"A. J." Ditch	Antelope Creek**	April, 1885	1.42
Id.	Home Ditch	Antelope Creek**	April, 1885	.28
Id.	Antelope No. 1	Antelope Creek**	April, 1886	.92
Id.	Antelope No. 3	Antelope Creek**	June 1, 1886	.43
Id.	Garden Ditch	Antelope Creek**	April, 1887	.21
F. B. Collins	Collins No. 2	Running Water***	1884	.28
Andrew Johnson	Johnson No. 2	Running Water***	September, 1886	.28
Id.	Johnson Ditch	Running Water***	September, 1886	.43
Jackson I. Brown	Shell Creek Water Ditch	Shell Creek	February, 1877	2.43
Josiah D. Payne, Jr.	Farr Ditch	Shell Creek	Spring, 1883	4.14
Id.	Payne Ditch	Shell Creek	Spring, 1885	.21

(*Dry Creek, a tributary of Shell Creek)
(**Antelope Creek, a tributary of Sand Creek)
(***Running Water, a tributary of Sand Creek)

All these appropriations have dates of priority senior in time to June 15th, 1899, except that of John Goetz which has date of priority May 28th, 1900, and show a total of 86.85 cubic feet per second of time under Wyoming appropriations that are prior in time to any right in the Defendant, State of Colorado, under its appropriation with priority of June 15th, 1899.

As to the validity of these Wyoming and the Colorado water rights, the extent thereof, or the existence of the same relating only to Sand Creek and its natural tributaries, there is no controversy. It is conclusively shown that, notwithstanding the existence of the senior rights in Wyoming, Colorado has taken and permitted to be taken in Colorado by this junior appropriator with June 15th, 1899, priority, the entire available flow of Sand Creek above the point of diversion for the Wilson Supply Ditch. The result of this taking has been an almost continuous shortage of water for the Wyoming appropriators, first noticed immediately after the Divide section of the Wilson Supply Ditch had been placed in operation; and with the exception of one or two years when precipitation was considerably above normal, that shortage has been experienced. (Testimony of witness Lundquist, Rec. pp. 102-106)

No claim is made in the case at Bar by the State of Colorado to a right to divert and take, by reason of having made an appropriation of the waters of Sand Creek and its tributaries other than the right decreed to it by the Colorado court fixing the date of priority as June 15th, 1899, authorizing the appropriation under said decree, of the waters of Sand Creek for the Sand Creek Ditch System by construction. The decree of the Colorado court determining the appropriator's right to participate in the use of the waters of Sand Creek, does not authorize or justify the practice that has been pursued by the State of Colorado of taking all of the water that this stream furnishes above the point of diversion and diverting it to Sheep Creek for either storage for future use or for present irrigation.

There are many appropriators from Sand Creek and tributaries who have been injured by the action of the Divide Canal and Reservoir Company in diverting the waters of Sand Creek and tributaries. The diversions to the Cache la Poudre River from Sand Creek take away the water that would otherwise be available to prevent the shortages that

have occurred practically every year since the Divide Ditch has been in operation. The appropriators having water rights dependent upon the waters of Sand Creek and tributaries, as shown in Complainant's Exhibit No. 85 (Rec. pp. 1160-1200), have been deprived of water by the diversions from Sand Creek to Sheep Creek by the Divide Canal and Reservoir Company under its junior priority. (Testimony of witness Goetz, Rec. pp. 111-117; testimony of witness Cook, Rec. pp. 117-121)

—IX—

The Protection of Wyoming's Equity in the Use of the Waters of the Laramie River Requires that the Supervision of the Diversions in Colorado be Placed Under the Control of an Independent Agency.

The Colorado recognized appropriations have their diversion points within the territorial jurisdiction of that state. Except by consent of Colorado, Wyoming cannot visit these points of diversion, cannot make independent inspections of the automatic measuring devices installed for recording the water being diverted, and cannot exercise any jurisdiction or control over the measuring devices or over the diversion works. Complainant, recognizing this situation, attempted to gain the consent of Colorado to participate in making an inventory of the amount of water diverted under the recognized Colorado diversions from the Laramie River and called Colorado's attention to the desire of Wyoming to reach some amicable basis whereby Wyoming would be fully advised of the amount of the diversions being made and have some voice in superintending and controlling the same.

Wyoming's first endeavor was to enlist the cooperation of the United States Geological Survey as an independent agency to join with the representatives of Wyoming and Colorado when, on February 27th, 1928, Mr. Whiting, State Engineer of Wyoming, addressed a letter to Mr. Follansbee at Denver, Colorado, District Engineer of the United States Geological Survey. (See Record, page 205, where Mr. Whiting says he first took up this matter with Mr. Follansbee by letter of February 27th, 1928.) This letter is marked "Complainant's Exhibit No. 20," and appears at page 991 of the Record. Mr. Follansbee, as District Engineer of the

United States Geological Survey, answered Mr. Whiting's letter and the answer appears as Complainant's Exhibit No. 21, at page 991 of the Record.

On March 8th, 1928, Mr. Whiting addressed a letter to Mr. M. C. Hinderlider, State Engineer of Colorado, which letter appears in the Record at page 992 as Complainant's Exhibit No. 22, wherein Mr. Hinderlider's attention is called to the fact that Wyoming is of the opinion that excess quantities of water are being diverted and taken by Colorado from the Laramie River to the Cache la Poudre River and Mr. Whiting requests Colorado's friendly cooperation to make an inventory of these diverted quantities, free of expense to Colorado. An answer by Mr. Hinderlider to Complainant's Exhibit No. 22 appears as Complainant's Exhibit No. 23 (Rec. p. 994A) which acknowledges that Mr. Whiting's request has been received and that the proposition will be presented to the owners of the ditches diverting water from the Laramie River in Colorado.

On March 31st, 1928, Mr. Whiting addressed further detailed information to Mr. Hinderlider, endeavoring to explain the purpose of desiring the survey to be made of diversions from the Laramie River to the Cache la Poudre River, and this communication appears as Complainant's Exhibit No. 24. (Rec. pp. 995, 996) Mr. Hinderlider replied on April 2nd, 1928, (Complainant's Exhibit No. 25, Rec. p. 996A) to Mr. Whiting's letter (Complainant's Exhibit No. 24) advising that it would be necessary to secure the cooperation of the Colorado ditch interests, because to make the survey, it would be necessary to enter upon private property and he suggested that Mr. Whiting assume the burden of contacting the Colorado ditch interests.

Further pursuing his efforts to arrange for the inventory of the Laramie River diverted water, Mr. Whiting addressed a letter (Complainant's Exhibit No. 26, Rec. pp. 997, 998) to Mr. Hinderlider and, also, sent a letter (Complainant's Exhibit No. 27, Rec. p. 998) to Mr. Follansbee. Wyoming, being unable to make progress for a friendly inventory and survey of the diversions from the Laramie River, on May 20th, 1929, addressed her Exhibit No. 29 (Rec. p. 999) to the State of Colorado, stating what in her judgment should be the limit of diversions from the Laramie River to the Cache la Poudre River and what information Wyoming should receive regarding diversions, with a right of inspec-

tion of the automatic gauge chart meter measurements and related records of Colorado's trans-mountain diversions, and the installation of a rating flume and automatic gauge on Deadman Feeder or Wilson Supply Ditch. On April 5th, 1928, Mr. Hinderlider replied to Mr. Whiting's letter of April 3rd, the reply being Complainant's Exhibit No. 30 (Rec. pp. 1000A, 1000B), and the request of Wyoming to make an independent or original inventory and appraisement of diversions or to have anything more than permission to inspect the records made under Colorado's exclusive supervision, was, in effect, denied.

Thereafter, on June 21st, 1930, the State of Wyoming addressed her Exhibit No. 32 (Rec. pp. 1001-1004), to officials of the State of Colorado, wherein she called Colorado's attention specifically to conditions prevailing with relation to diversions from the Laramie River to the Poudre River, stated her construction of the rights of Colorado under the decree entered in the suit formerly tried between these two states relating to the rights of each state to enjoy the use of the waters of this interstate stream, and requested that Colorado conform to the limits of the decree. Colorado, on August 14th, 1930, sent to Wyoming, in reply to her Exhibit No. 32, a letter (Complainant's Exhibit No. 33, Rec. p. 1004A), wherein she advised that she had been unable to find that Colorado or her citizens have violated the decree by diversions through the Tunnel in excess of the amount allowed or by aggregate annual diversions by Colorado users in excess of the total amount mentioned in the decree.

The testimony of Mr. Whiting for Wyoming accompanying these exhibits in connection with his efforts to arrange for measurements of Laramie River trans-mountain diversions, appears in the Record at pages 205 to 218, inclusive. After Mr. Whiting was advised that Colorado would not consent to the proposal he had made to make this joint study (Rec. p. 212), Wyoming continued her efforts to bring about an amicable determination of the question with Colorado. (Rec. pp. 212, 213) Failing to make any progress, Wyoming employed engineers to proceed, under the direction of State Engineer Whiting, with an independent observation and study of the trans-mountain diversions and an inspection of the measuring devices installed. As a result of this investigation, Wyoming concluded that the Colorado trans-mountain diversions were taking water in excess of

the amount authorized by the decree of the United States Supreme Court. (Rec. p. 216) These conclusions were immediately stated in writing and brought to the attention of the officials of the State of Colorado. (Complainant's Exhibit No. 32, Rec. pp. 1001-1004)

The effort to bring about the solution of the controversy was continued by a conference held in Greeley, Colorado, about September 26th, 1930, but no progress was made at this conference and this was the last attempt by Wyoming officials to obtain the cooperation of Colorado in determining the diversions of water being made from the Laramie River to the Cache la Poudre River. (Rec. pp. 218, 219)

The evidence shows clearly Wyoming's efforts, over a period of more than two years, to avoid the necessity of having the question of the amount of water authorized to be diverted by Colorado from the Laramie River under the former decree, brought to the attention of this Honorable Court. She employed every means available to influence Colorado to cooperate with her and the United States Geological Survey, as a third and independent agency, to determine these questions amicably and promptly between the two states, and her efforts were in vain. Wyoming was compelled to bring this suit to protect her rights.

Mr. Hinderlider testified that he considers that the quantity of water allocated to Colorado is to be measured by mass allocation, consisting of the aggregate amount of 18,000 acre feet for the Skyline Ditch, 15,500 acre feet for the Laramie-Poudre Tunnel, and 4,250 acre feet for the meadow rights, making a total of 37,750 acre feet, exclusive of the unknown quantity for the Wilson Supply Ditch (Rec. p. 410); that he has always considered, as an administrative officer, that, under the decree, the 4,250 acre feet allotment for the meadow rights should be measured as a consumptive use, not actual headgate measurement (Rec. p. 411); and at page 412 of the Record, that the Supreme Court decision authorized diversions in larger amounts than 4,250 acre feet, because a portion of the diverted water would return to the stream and that the stream would not, by reason of these larger diversion quantities, be depleted beyond 4,250 acre feet; that he has always construed the words in the decree, "divert and take," to mean "to consume," so far as its effect upon Wyoming is concerned (Rec. p. 411); that, notwithstanding the decree originally rendered and the later

opinion construing the decree, he still is of the opinion that Colorado is authorized to make a mass diversion, so long as 37,750 acre feet are not exceeded as a total and that Colorado could permit as many diversions from the Laramie River watershed as she desires (Rec. pp. 412, 413); that he has read the decree of June 5th, 1922, the modified decree of October 9th, 1922, and the opinion of May 31st, 1932; that he is not yet able to determine what the rights of Colorado are with reference to whether the diversions are limited to specific quantities for recognized appropriations or whether a mass allocation of water was awarded to Colorado that might be diverted from any source and by any means which Colorado chose to recognize. (Rec. pp. 815, 816)

Mr. Hinderlider further says the Attorney General advised him that it was his opinion that a mass allocation of water was awarded to Colorado and that the Bob Creek Ditch and the Columbine Ditch would be entitled to divert water under the decree (Rec. p. 816), but that as a matter of precaution pending the final disposition of this case, he requested the Bob Creek and Columbine Ditches to discontinue diversions (Rec. p. 816); that in his judgment, the Skyline Ditch is not limited to 18,000 acre feet in a year and that if the courts of Colorado should recognize the right of any additional canal to divert water through the Laramie-Poudre Tunnel, he would have no authority to object (Rec. p. 819); that for the purpose of collecting water and diverting it from the Laramie River to the Poudre River, Colorado might authorize the extension of any diversion works to tap any new source of supply and divert the water thus captured, without violating the United States Supreme Court decree, so long as the total Tunnel diversions did not exceed 15,500 acre feet; that he only recognizes the Laramie-Poudre Tunnel as the agency of the State of Colorado which is definitely limited to 15,500 acre feet; that it would be legal to construct in the future, a ditch to tap Deadman by means of what has been referred to as the East Side Collection Ditch and other creeks, diverting and delivering water to the mouth of the Tunnel, so long as the diverted quantity was not in excess of 15,500 acre feet (Rec. pp. 819, 820); that under the United States Supreme Court decree of June 5th, 1922, in his belief, future diversions or extensions of existing works could be made to tap any source of water originating in the Laramie River Basin in Colorado, so long

as the total amount of water diverted did not exceed 37,750 acre feet (Rec. p. 820), but he does recognize that the appropriation recognized by the United States Supreme Court decree for the Greeley-Poudre Tunnel is limited under the laws of the State of Colorado to the use of the works heretofore initiated for diverting from the west branch of the Laramie River and tributaries and east branch of the Laramie River and tributaries (Rec. p. 820); that the Tunnel would be limited in its diversions to the sources of diversion and supply named in the adjudication proceedings under the laws of the State of Colorado.

Mr. R. J. Tipton, an official of the Defendant, State of Colorado, is, also, unable to understand the limitations placed upon the right of Colorado to divert and take water from the Laramie River under the decree of June 5th, 1922. (Rec. pp. 861-865) This witness says:

> "In my opinion if the Supreme Court Decree of 1922 in the case of Wyoming vs. Colorado is interpreted to mean that the Skyline Ditch is limited to 18,000 acre feet diversion in any one year, the effect would be to tend to deprive the owners of the Skyline Ditch of some water that they enjoyed the use of prior to the filing of the former Wyoming vs. Colorado suit." (Rec. p. 861)

Mr. C. L. Patterson, another Colorado witness, testified (Rec. pp. 728-733) that he could not understand from the language used in the decree defining the relative rights of Colorado and Wyoming to the use of the waters of the Laramie River, that there was any specific limitation placed upon the amount that might be diverted through any single diversion, whether recognized or not, except that 15,500 acre feet would be the limit for the Laramie-Poudre Tunnel in any one year; that the Skyline Ditch should be permitted to divert with a limit only in accordance with the amount of water appropriated for it and recognized by the laws of the State of Colorado; that the meadow land diversions should not be measured headgate quantities, but should be controlled by the amount consumed; and Mr. Patterson further says (Rec. pp. 728-734) that if he was administering the decree, he would do it in exactly the way he has explained it in his testimony and if that method did not satisfy Wyoming, it would be necessary to come back to court, because the basis

is not understandable but that all of this controversy could be eliminated if the court would accurately state, in terms of engineering practice, what it intends the decision to cover. (Rec. p. 734)

Mr. Fred A. Harrison, a witness for Colorado who had served as Assistant Attorney General, was called to testify as to his understanding of Colorado's rights under the decree and his testimony is shown at pages 419 and 420 of the Record.

The Record discloses that an attorney general, an assistant attorney general, a state engineer, and two other engineers, have all testified in this case after May 31st, 1932, when the opinion of the United States Supreme Court was delivered clearly defining the relations of Wyoming to Colorado in the use of the waters of the Laramie River, that in their opinion, Colorado is still entitled to continue the practice and method that Wyoming had complained of and that was recognized and approved by Colorado prior to the time this suit was started and subsequent to the time the decree of June 5th, 1922, was rendered. Mr. Hinderlider, as State Engineer of Colorado, states that until further advised, he feels it within his rights to control diversions of water in Colorado, permitting the Bob Creek Ditch and the Columbine Ditch to divert water under his interpretation of the Supreme Court decree. (Rec. p. 818)

CONCLUSION

Complainant submits that she is entitled, upon the facts established and as shown by the Record:

1. To have the measurement and recording of water lawfully diverted from the Laramie River to the Cache la Poudre River placed under the authority of the United States Geological Survey or such other independent agency as shall be designated by this Court.

2. That the State of Colorado be ordered to install, at the location determined by competent authority to be the most favorably situated for the accurate measurement of water diverted through the Laramie-Poudre Tunnel, a standard measuring device capable of accurately recording and measuring the diverted quantities of water.

3. That the State of Colorado be enjoined from diverting or permitting the diversion or taking of water from the Laramie River watershed in Colorado, except to satisfy those appropriations which were specifically recognized as being entitled to divert stated quantities of water under the former decree, namely,

(a) Not to exceed 18,000 acre feet annually under the Skyline Ditch appropriation;

(b) Not to exceed 4,250 acre feet annually, headgate measurement, for the irrigation of meadow lands located in the valley of the Laramie River in Colorado;

(c) Not to exceed 15,500 acre feet annually, under the Laramie-Poudre Tunnel appropriation through the Laramie-Poudre Tunnel.

4. That the State of Colorado be enjoined from diverting or permitting the diversion or taking of any water from the headwaters of Deadman Creek.

5. That the State of Colorado be enjoined from diverting or permitting the diversion or taking of any water from Bob Creek and its tributaries, Columbine Creek and its tributaries, Rawah Creek and its tributaries, and Lost Lake System.

6. That the State of Wyoming be decreed the right to go upon the premises in Colorado where the diversions of water are authorized to be made from the Laramie River and make such reasonable inspections and observations as her officials may desire, and be furnished with all records showing diversions made to satisfy recognized Colorado appropriations.

7. That the State of Wyoming recover her costs herein expended and have such other and further equitable relief as to the Court may appear proper in the premises.

Respectfully submitted,

RAY E. LEE,
Attorney General of the State of Wyoming,

JAMES A. GREENWOOD,
Special Counsel for the State of Wyoming,
Cheyenne, Wyoming,
ATTORNEYS FOR COMPLAINANT.

THOMAS F. SHEA,
Deputy Attorney General of Wyoming,

WILLIAM C. SNOW,
Assistant Attorney General of Wyoming,
OF COUNSEL.

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CHARLES ELMORE C

In the

Supreme Court of the United States

October Term, 1935

No. 10, Original
IN EQUITY

THE STATE OF WYOMING,
Complainant,

vs.

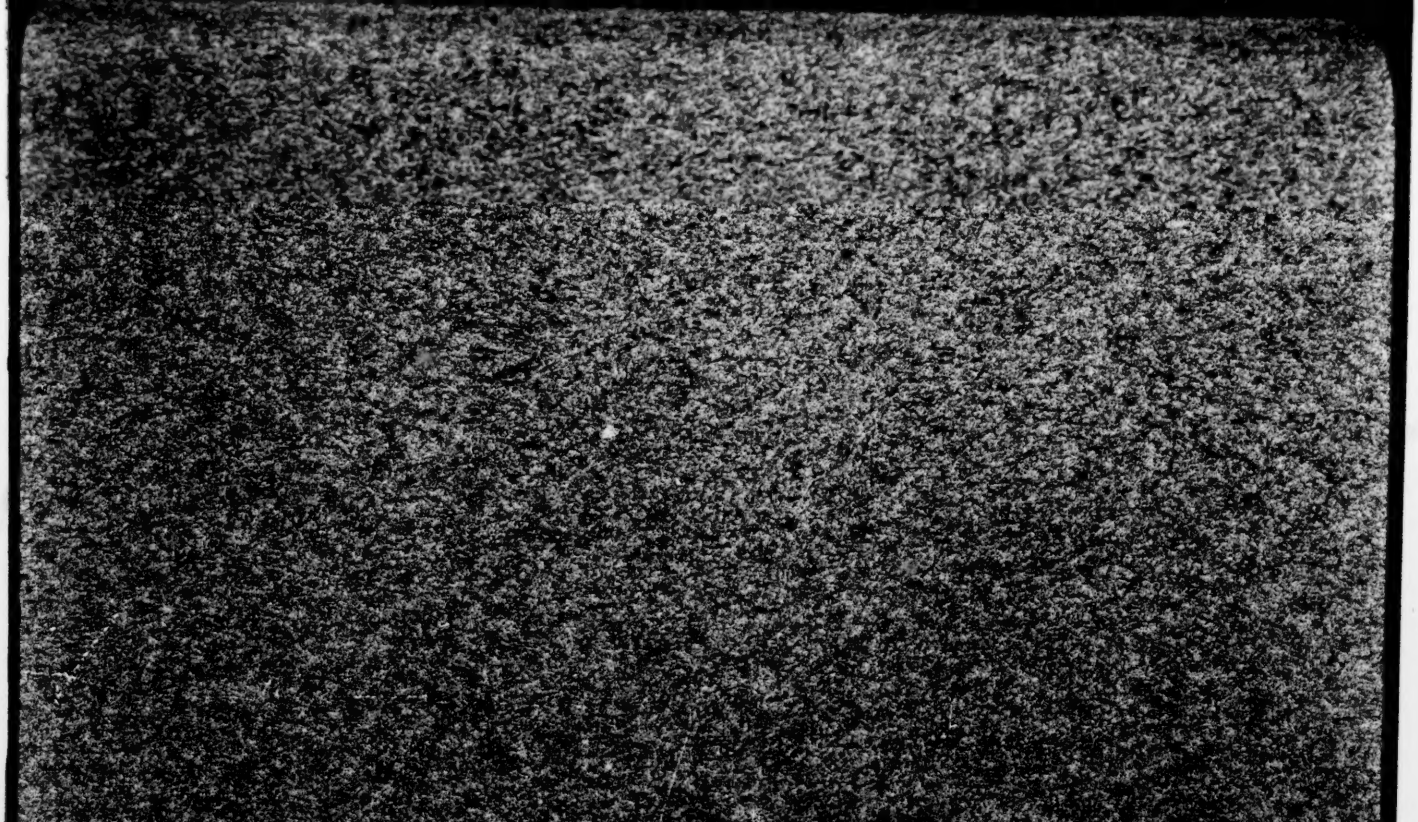
THE STATE OF COLORADO,
Defendant.

DEFENDANT'S BRIEF AND ARGUMENT.

PAUL P. PROSSER,
Attorney General
of the State of Colorado,
SHRADER P. HOWELL,
Assistant Attorney General
of the State of Colorado,
Solicitors for Defendant.

C. D. TODD,
WILLIAM R. KELLY,
LAWRENCE R. TEMPLE,
WILLIAM A. BRYANS, III,
Of Counsel.

CLARK QUICK-PRINTING CO., LAWRENCE 1332 34, DENVER, COLO.



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In the

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THE STATE OF WYOMING,
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THE STATE OF COLORADO,
Defendant.

DEFENDANT'S BRIEF AND ARGUMENT.

STATEMENT.

The State of Wyoming filed her Bill of Complaint herein on October 6, 1930, as set forth in the Record, pages 4-20.

To said Bill, the State of Colorado, on April 6, 1931, filed her motion to dismiss, in the nature of a demurrer, which was heard by the Court, and was denied on May 31, 1932. The opinion of the Court ruling on said motion is reported in 286 U. S. 494; 76 L. Ed. 1245.

Thereafter and on June 30, 1932, Wyoming filed her amended Bill of Complaint (R. 32-50), and on September 15, 1932, Colorado filed her answer to the amended Bill (R. 31-70), which answer denied generally any violation of the decree of the Court entered June 5, 1922 (259 U. S. 419), as modified October 9, 1922 (260 U. S. 1), and presented new matter justifying her conduct with respect to her diversion and use of the waters of the Laramie River, following the date of the said decree. To the answer, the complainant filed replication on October 31, 1932 (R. 71-79).

On the issues joined, evidence was taken before Commissioners of this Court, commencing on April 17, 1933, and concluding on July 6, 1933.

A general statement of the issues follows, and particular statements with reference to the several diversions involved will be set forth in the subdivisions of this brief relating to each.

General Statement of the Issues.

Character of present proceedings, and decisive issues. The issues here were defined at the outset by the Court's opinion of May 31, 1932, upon defendant's motion to dismiss the bill of complaint. The motion had raised the objections of: (1) lack of Colorado appropriators as parties, and (2) questioned whether there had been previously determined the full quantity of water which rightfully may be diverted from the Laramie River in Colorado, and likewise the quantity which Wyoming and her water users are entitled to receive and use from the stream within that State; and (3) that, in any event, the bill fails to show with certainty any violation of the decree or any damage to Wyoming or her water users.

The Court's opinion (286 U. S. 494), so at the outset, defined the issues and clarified them:

"This is a suit brought by the State of Wyoming against the State of Colorado (1) to enforce a decree of this Court (259 U. S. 419, 260 U. S. 1) rendered in an earlier suit between the same States respecting their relative rights to divert and use for irrigation the waters of the Laramie River, a stream rising in Colorado and flowing northward into Wyoming.

In the present bill, shortly described, Wyoming alleges that Colorado is departing from that decree by permitting (1) diversion and use within her territory of waters of the Laramie in quantities (a) *largely* in *excess* of those *accorded to her by* the *decree;* that these excessive diversions are (b) *preventing Wyoming* from receiving and using the *amount* of water which the decree *accorded to her,* (2) that Colorado, unless restrained by this Court, *will* continue to *permit* such *excessive* diversions and thereby will (3) *largely* or entirely *deprive Wyoming* of the use of the water *accorded* to her *in* the *decree;* that the measuring devices installed by Colorado to measure the waters diverted within her territory (1) do not accurately show the *full quantities* so diverted; and that (2) Colorado refuses, although duly requested, to (3) permit Wyoming to install *other suitable devices* or *participate* in the *measurements.*"

We have above by italics, numerals, and parentheses, pointed out for later discussion what seem the essential allegations to be examined.

The motion to dismiss was overruled, leave was given the State of Wyoming to amend by making more definite, which she did. The State of Colorado answered, denying violation of the decree, declaring desire to observe it and willingness to have Wyoming participate in measurements in Colorado.

The decree here alleged to have been violated and sought to be enforced was in a suit, in which, in addition to the State of Colorado, there were made defendants the Greeley Poudre Irrigation District, for whom it was being constructed, and The Laramie-Poudre Reservoirs and Irrigation Company which was constructing, the Laramie-Poudre tunnel project, a system of works at the high altitudes on the Laramie River in Colorado to collect waters from the Laramie and its tributaries, carry them to the tunnel from the Laramie into the Poudre and then through, and to redivert them from the Poudre for irrigation of lands in the District.

The decree "enjoined from diverting or taking from the Laramie River and its tributaries in the State of Colorado more than 15,500 acre feet of water per annum in virtue of or through what is designated in the pleadings and evidence as the Laramie-Poudre tunnel appropriation in that State" and continued therein, and by modified decree of October 9, 1922, 260 U. S. 1, to provide recognition also of certain other appropriations.

(a) THE BILL HERE IS TO ENFORCE A DECREE WHICH DETERMINED THE RELATIVE RIGHTS OF EACH OF THE STATES IN THE WATERS OF THE LARAMIE RIVER.

In her brief filed herein in opposition to motion to dismiss, the complainant, in the opening paragraph, stated the object of the suit as follows:

> "The bill seeks to prevent violations of the decree entered October 9, 1922, reported in Vol. 259, U. S. Rep., page 419, and Vol. 260, U. S. Rep., page 1."

And, on page 2, amplified this:

> "To bring clearly before the Court the only question involved in the case at Bar, complainant states that it is the contention of the complainant

that in the decree entered in the case of Wyoming v. Colorado, 259 U. S. Rep. page 419, 260 U. S. Rep. page 1, the Court determined the available annual water supply for diversion and use to satisfy the demands of the various appropriators and users of water from the Laramie River and tributaries within the States of Colorado and Wyoming, and determined the relative rights of each of said states in the use of the waters of said Laramie River and tributaries."

On page 7 of that brief, Wyoming again stated:

"The subject matter of this suit is the enforcement of the decree as rendered in the former Wyoming-Colorado case, supra, which determined the relative rights of the States of Wyoming and Colorado in the use of the waters of the Laramie River, an interstate stream, and its tributaries."

To abstract the ruling thereon and the essential allegations of the present bill the language of the Court in that opinion interpreting that decree, on the motion to dismiss seems most concise: 286 U. S. 494, 507; 76 L. Ed. 1245, 1251. The Court said:

"As before shown, the modified decree (1) restricts diversion under the Colorado tunnel appropriation to 15,500 acre feet, the amount which under the findings would remain in the supply after deducting the quantities included in the senior appropriations in both States; (2) recognizes and protects the Skyline appropriation of 18,000 acre feet, it being a senior Colorado appropriation; (3) similarly sustains the meadowland appropriations of 4,250 acre feet, they being senior Colorado appropriations; (4) recognizes and protects the small Wilson Supply ditch appropriation made prior to 1902, it being a senior Colorado appropriation in-

advertently omitted from the list in the opinion but given its proper place by a modification of the original decree; and (5) saves from prejudice all appropriations of the waters of Sand Creek, found not to be a tributary of the Laramie.

"The decree enjoins any diversion through the tunnel appropriation in excess of the 15,500 acre feet accorded to it—and this doubtless for the reason that there had been a declared and real purpose to divert from 56,000 to 71,000 acre feet under that appropriation. No showing appears to have been made indicative of any occasion at that time for a broader injunction. Of course, in the absence of such showing, a broader injunction was not justified. Certainly the limited injunction which was granted does not warrant any inference that it marks the limits of what was intended to be decided. Such an inference would be inconsistent with other parts of the decree and with the opinion and the findings therein.

"Construing the decree in the light of the record and opinion, to which counsel for both States appeal, we think it was intended to and does define and limit the quantity of water which Colorado and her appropriators may divert from the interstate stream and its tributaries and thus withhold from Wyoming and her appropriators.

"But it is said that water claims other than the tunnel appropriation could not be, and were not, affected by the decree, because the claimants were not parties to the suit or represented therein. In this the nature of the suit is misconceived. It was one between States, each acting as a quasi-sovereign and representative of the interest and rights of her people in a controversy with the other. Counsel for Colorado insisted in their brief in that

suit that the controversy was 'not between private parties' but 'between the two sovereignties of Wyoming and Colorado' and this Court in its opinion assented to that view, but observed that the controversy was one of immediate and deep concern to both States and that the interests of each were indissolubly linked with those of her appropriators. 259 U. S. 468. Decisions in other cases also warrant the conclusion that the water claimants in Colorado, and those in Wyoming, were represented by their respective States and are bound by the decree.

"The contention that the present bill shows that the acts complained of are not acts done by Colorado, or under her authority, but acts done by private corporations and individuals not parties to the present suit, is shown by the bill to be untenable. It is there alleged that Colorado in 1926 permitted a diversion from the Laramie through the Laramie-Poudre tunnel appropriation materially in excess of the 15,500 acre feet specified in the decree; that in 1926, 1927 and 1928, with the knowledge, permission and cooperation of Colorado, diversions were made from the Laramie and its tributaries through the Skyline ditch appropriation in stated amounts materially in excess of the 18,000 acre feet specified in the decree; that in 1926, 1927, 1928 and 1929, with the knowledge, consent and cooperation of Colorado, diversions were made from the Laramie and its tributaries through the meadowland appropriations in various amounts pronouncedly in excess of the 4,250 acre feet specified in the decree; and that Colorado has permitted other diversions from the Laramie and its tributaries in violation of the decree through the Bob Creek and other designated ditches, none of which were recognized or named in the findings or decree."

The Court thereupon held adversely to the argument of Colorado's motion that water claims other than the tunnel appropriation were not affected by the decree because the claimants were not parties to the suit. They "were represented by their respective States and are bound by the decree."

> "Plainly there is enough in the bill to require that the defendant be called upon to answer it."

Colorado answered in detail the allegations of the amended bill of complaint. Its position generally is epitomized in R. 53-69.

The admissions of the defendant: The answer of Colorado admits certain of the allegations of the amended bill, as set forth in the Wyoming brief, pp. 7 and 8. These admissions, however, are of the allegations of the amended bill as to what was found by the Court, and are to be taken in connection with the context of the Court's opinion and decree as to the basis of arriving at the 288,000 acre feet total available water supply of the Laramie in both States, i. e., that the recognized diversions of the Skyline Ditch, Meadow Land Ditches, and of the Wilson Supply ditch from Deadman Creek were always to be recognized, and were always taken out, in arriving at the 272,500 acre feet available supply basis for Wyoming.

Broadly stated, Colorado denies a withholding or depletion of the Laramie River beyond her decreed apportionment of it.

As to administration and measurement, Colorado responds that vigilant administration is made, both by the State Officials and by the appropriators, of diversion and measurement, to record fully within practical limits, by improved standard weirs, comformable to practices in like localities in Wyoming and by recording instruments fairly accurate, all water withheld from Wyoming and consumed

in Colorado. Further, that the measuring has always been open to Wyoming, that she has not been refused, but through her agents at all times has had free access to, all measuring weirs and to the records of the State Engineering Department of Colorado which is the water administrative agency of this State. Offer to Wyoming of continued access to make its own measurements and to check upon the measurements and measuring devices of the State of Colorado is made.

The answer does not stop with mere denials, but delineates her position with detailed explanation of its works complained of in the Amended Bill of Complaint, discloses its diversions, and other facts and explanations to disavow that Colorado has diverted, or intends to divert, either largely in excess, or in excess at all, of the amount permitted to be withheld by it, and proffers cooperative measurements and exchange of records of diversions. (R. 51-70.)

(b) THUS TWO ISSUES ARE BEFORE THE COURT:

1. Has Colorado largely exceeded what the Court there decreed "The quantity of water which Colorado and her appropriators may divert from the interstate stream and its tributaries *and thus withhold* from Wyoming and her appropriators."? 286 U. S. 494, 507; 76 L. Ed. 1245, 1251. The gist of it is *withholding* from Wyoming.

2. Is the water administration of the Laramie River in and by the State of Colorado, as to the measurement of such quantities, not reasonably accurate, so that the United States Government should intercede now and take it over?

The waters of this interstate stream have been apportioned. They are derived from both States. Both States have rights in the river. They are recognized and defined

by that decree. Has Wyoming been deprived of her rights there accorded in the interstate stream, by acts of Colorado which withheld quantities materially in excess of that apportioned share which Colorado may withhold?

Wyoming, on page 2 of its brief, at the outset declares its position that the ruling of the Court on defendant's motion to dismiss (286 U. S. 494, 506; 76 L. Ed. 1245, 1251) has settled the question of construction of the decree in the former case, leaving for determination the question, "Has the State of Colorado violated the decree?" So narrowed, we take it that if the proof does not show Colorado has violated the decree, then the second issue above stated, receivership in effect, will not here require action by the Court. Since Wyoming has however gone on to argue matters of construction of that decree we shall here answer such argument with the views of the State of Colorado thereon.

(c) THE ISSUES HERE INVOLVED ARE NOT BETWEEN INDIVIDUAL APPROPRIATORS ON OPPOSITE SIDES OF THE STATE LINE BUT IT IS A CONTROVERSY BETWEEN TWO QUASI-SOVEREIGN STATES APPEARING AS PARENS PATRIAE.

What was intended to be decided and was decided by that decree was "the quantity of water which Colorado and her appropriators may divert from the interstate stream and its tributaries and thus withhold from Wyoming and her appropriators." (Wyoming v. Colorado, 286 U. S. 494, 508.)

It did not decide what were the relative rights, as between the claimants in each state among each other within the same state, what were their respective individual priorities or rights. That is a matter of local law and judicial determination among them through the State Courts and administrative agencies. It is a well settled rule of the Supreme Court of the United States that when-

ever the federal power is exerted within what would otherwise be the domain of the State power, the justification of the exercise of the federal power must clearly appear.

The United States Supreme Court in this original case decided only the rights between the whole of the appropriators of each State as against the whole of the appropriators in the other State. It so found, and held that, after prior appropriations in Colorado and in Wyoming were satisfied there were 15,500 acre feet available for the Colorado Laramie Tunnel appropriation which the Court dated from late October, 1909.

That the Laramie-Poudre appropriator and none other in Colorado was made a party to that suit confirms its aspect as solely one between states whose decree decided rights and apportionment of water solely between states, not between individuals. Even the Greeley Poudre or Laramie-Poudre interest, there made a party, had no right to litigate in its own behalf, as against other Colorado appropriators, the merits of the controversy. Certainly those other Colorado appropriators, eighty or more, not made parties could not there litigate and have their rights determined as between each other.

> "The fact that an individual citizen in such a case is made a party defendant in order that the complainant may obtain some particular relief against him, which is merely incidental to the complete relief to which the complainant would be entitled if it should prevail as against the defendant state, gives such an individual defendant no standing to litigate on his own behalf the merits of a controversy which, properly viewed, lies solely between the states but only to contest the propriety of the particular relief sought against him in case the decision on the merits is against his state. This gives an individual defendant in such a suit between

states full opportunity to litigate the only question which concerns him individually as distinguished from the questions which concern him only in common with all the citizens of his state." Kentucky v. Indiana, 281 U. S. 163, 175; 74 L. Ed. 797.

From the foregoing, it is seen that the position of the complainant in the outset has been, as is also that of the Colorado water officials, that the decree was determinative of the relative rights of each of the States in the water of the Laramie River and tributaries. The United States Supreme Court did not attempt to determine in such a suit the rights of different individual appropriators between each other.

We again quote from the brief of the State of Wyoming in opposition to motion to dismiss (p. 41):

> "The single question presented to this Honorable Court is whether Colorado's relative right to the use of the waters of the Laramie River is limited to 37,750 acre-feet per annum, or is the only limitation on Colorado, the 15,500 acre-feet annually, allowed for the tunnel."

And, from page 42 thereof, showing that Wyoming's position in this suit, as heretofore taken, is that the decree of October, 1922, was a mass allocation of the water between the two states:

> "On the contrary, Wyoming in this proceeding rests her claim for relief solely upon the contention that the allocated portion of the water to which citizens or corporations, diverting water under the laws of Colorado and under her supervision and with her consent, are limited to the aggregate amount which this Court in said former Wyoming-Colorado decree found as her relative right or equitable interest in the use of the waters of that

stream, to be the amount of 37,750 acre-feet annually, and that Colorado, through her officials charged with the administration of the diversion and use of the water of the Laramie River, in Colorado, is ignoring the decree of this Honorable Court which determined the said relative rights of the complainant and defendant in the use of the waters of this interstate stream."

The citizens of each State are concluded by the decree between the States. This Court said in Wyoming v. Colorado, 286 U. S. 507:

> "The decree must be taken as determining the relative rights of the two States including their respective citizens to divert and use the waters of the Laramie and its tributaries." * * *
>
> "It was one between States, each acting as a quasi-sovereign and representative of the interests and rights of her people in a controversy with the other." * * *
>
> "Decisions in other cases also warrant the conclusion that the water claimants in Colorado, and those in Wyoming, were represented by their respective States and are bound by the decree."

We quote the above summations of decision and exposition of the decretal effect of that decision for the reason it was sought and brought forth by means of the motion of Colorado to dismiss the bill and thus furnished the guide to relevancy on trial of the issues here raised, i. e., whether the rights of Wyoming and her citizens have been invaded or are threatened to be invaded in depletion of the river by water withheld in Colorado.

But while the decree between the States is held binding upon all claiming rights within and under the States, we do not take it the decree holds that the rights of

each citizen and appropriator within each State were litigated as between each other in that former suit. In it must have been involved several hundreds of citizens, claimants or owners of Laramie River water rights in each of the States of Colorado and Wyoming, adversely interested among themselves in each State as appropriators in the several diversions theretofore initiated. The States were made the litigants rather as representatives of the aggregate of the rights of their citizens and appropriators, of the one State against the aggregate of the other State, rather than as each separate State pursuing the separate claims of each citizen against the separate citizens or appropriators of the other State.

> "The right of a state as *parens patriae* to bring suit to protect the general comfort, health or property rights of its inhabitants, threatened by the proposed or continued action of another state, by prayer for injunction, is to be differentiated from its lost power as a sovereign to present and enforce individual claims of its citizens as their trustee against a sister state."—North Dakota v. Minnesota, 263 U. S. 365, 375; 68 L. Ed. 342.

The Court took occasion to point out in Conn. v. Mass. in reviewing the basis of decision in apportionment of water in suits between States to say, in Conn. v. Mass., 282 U. S., page 660 at p. 670, 75 L. Ed. 602:

> "For the decision of suits between states, federal, state and international law is considered and applied by this Court as the exigencies of the particular case may require. The determination of the relative rights of contending states in respect of the use of streams flowing through them does not depend upon the same considerations and is not governed by the same rules of law that are applied in such states for the solution of similar questions

of private right. Kansas v. Colorado, 185 U. S. 125, 146; 46 L. Ed. 838, 846. And, while the municipal law relating to like questions between individuals is to be taken into account, it is not to be deemed to have controlling weight.

"As was shown in Kansas v. Colorado, 206 U. S. 46, 100; 51 L. Ed. 956, 975, such disputes are to be settled on the basis of equality of right."

The appropriators derive their rights to the water under their respective States. As between the States the United States Supreme Court has jurisdiction to apportion the water of this river because it is an interstate river. But as within the States themselves, each State is free to change its method of apportioning its water.

The determination of the interests in the water between the citizens of the State, whether upon a riparian basis or an appropriation basis, is for the local Courts of the several States. In the appropriation States there is a contest or rivalry between the various claimants as intending appropriators as to what shall be the dates of their priorities and what portion each shall be allowed to divert. That is a matter for the State tribunal that is within each State. As between the States, the Supreme Court has jurisdiction to determine what shall be the apportionment to each State. All the citizens of each State are bound by that apportionment, but as among themselves they may still litigate as to relative priorities, with respect to the determination of the titles of the separate citizens in that moiety of the water accorded the respective States. The governing rule is that the Supreme Court will not exercise its extraordinary power to control the conduct of the State unless the threatened invasion of rights of the other State is of serious magnitude and established by clear and convincing evidence.

As above pointed out in the quotation from 286 U. S. 494, 508, what was intended to be decided and was decided was the quantity of water which Colorado may withhold from Wyoming. To arrive at the quantity available for the appropriation then being prosecuted in Colorado by the Laramie-Poudre diversion, it was necessary to determine what amount of water was equitably to be apportioned to Wyoming and what amount of water was equitably to be apportioned to Colorado. In arriving at this, the Court determined what was the total dependable supply, 288,000 acre feet, after recognized earlier appropriations in Colorado had been supplied, and what appropriations in Wyoming were prior to the intending appropriator in Colorado, to-wit, 272-500 acre feet. This made 37,750 acre feet which was to be withheld by prior appropriations in Colorado through the Skyline and the Meadows, and including 15,500 acre feet available for the appropriation of Colorado, sought to be entirely enjoined, the Laramie-Poudre tunnel appropriation. This was exclusive of and in addition to the appropriations of the Wilson Supply Ditch which was also recognized as senior to the tunnel and Wyoming, but not defined, and the appropriations of Sand Creek which was found not to be a tributary to the Laramie. Upon this was decided that there was apportioned to the State of Colorado by those recognized appropriations of the Skyline, the Meadows and the tunnel, 37,750 acre feet of water, which amount Colorado may withhold from Wyoming without violating Wyoming's rights to the equitable apportionment of the waters of this interstate stream.

(d) ACTS OF SUCH SERIOUS MAGNITUDE AS TO INVOKE THE EXTRAORDINARY POWER TO CONTROL THE CONDUCT OF A STATE AT THE SUIT OF ANOTHER ARE NOT HERE CLEARLY SHOWN.

This Court in the case of Conn. v. Mass., 282 U. S. 660 at page 669 said:

"The governing rule is that this Court will not exert its extraordinary power to control the conduct of one State at the suit of another, unless the threatened invasion of rights is of serious magnitude, and established by clear and convincing evidence. New York v. New Jersey, 256 U. S. 296, 309; 65 L. Ed. 937, 943."

Missouri v. Illinois, 200 U. S. 496, 521; 50 L. Ed. 572.

"The burden on Connecticut to sustain the allegations on which it seeks to prevent Massachusetts from making the proposed diversions is much greater than that generally required to be borne by one seeking an injunction in a suit between private parties. North Dakota v. Minnesota, 263 U. S. 365, 374; 68 L. Ed. 342."

Propositions of Law.

I.

The former suit was, and the present is, between two States, each appearing as parens patriae, and not in litigation or defense of the individual claims of a citizen in one State against another State or individual citizens of another State, nor citizens individually against others in the same or in the other State.

Wyoming v. Colorado, 286 U. S. 494, 508; 76 L. Ed. 1245, 1251.

Kentucky v. Indiana, 281 U. S. 163, 175; 74 L. Ed. 797.

North Dakota v. Minnesota, 263 U. S. 365, 375; 68 L. Ed. 342.

II.

The governing rule is that this Court will not exert its extraordinary power to control the conduct of one State at the suit of another, unless the threatened invasion of rights is of serious magnitude and established by clear and convincing evidence.

Connecticut v. Massachusetts, 282 U. S. 660, 670; 75 L. Ed. 1416.

North Dakota v. Minnesota, 263 U. S. 365, 374; 68 L. Ed. 342.

New York v. New Jersey, 256 U. S. 296, 309; 65 L. Ed. 937.

Missouri v. Illinois, 200 U. S. 496, 521; 50 L. Ed. 572.

III.

The official of Colorado charged with keeping the record of water diverted from the Laramie River into the Cache la Poudre is the Commissioner of Water District No. 3, not the Commissioner of Water District No. 48.

Colorado Compiled Laws of 1921, Sec. 1704.

IV.

Appropriation of Wilson Supply Ditch was determined by this Court in the modified decree of October 9th, 1922, and considered and affirmed in this case on ruling on motion to dismiss.

Wyoming v. Colorado, 259 U. S. 419; 260 U. S. 1; 66 L. Ed. 999.

Wyoming v. Colorado, 286 U. S. 494, 497; 76 L. Ed. 1245.

V.

Appropriation defined; doctrine of relation is to be applied from time purpose is formed and actual work begun, provided work is carried to completion with reasonable diligence.

Wyoming v. Colorado, 259 U. S. 419, 459, 490; 66 L. Ed. 999.

Sieber v. Frink, 7 Colo. 148, 153; 2 Pac. 901, 903.

VI.

The Colorado Supreme Court has held the decree in adjudication of water rights determines the date of priority of right and the volume or capacity.

Louden Co. v. Handy Ditch Co., 22 Colo. 102; 43 Pac. 535.

Arnold v. Roup, 61 Colo. 316, 326; 157 Pac. 202.

VII.

In 1907, land and water rights were severable in Wyoming; the waters could be sold separately and transferred and used elsewhere at the will of the owner.

Frank v. Hicker, 4 Wyo. 502, 528; 35 Pac. 475.

McPhail v. Forney, 4 Wyo. 556, 560; 35 Pac. 773.

Johnston v. Little Horse Co., 13 Wyo. 208; 79 Pac. 22.

Groo v. Sights, 22 Wyo. 19, 30; 134 Pac. 269.

VIII.

Colorado laws have long recognized conditional decrees of priorities in adjudication of water rights.

Waterman v. Hughes, 33 Colo. 270; 80 Pac. 891.
Water S. & S. Co. v. Larimer Co., 24 Colo. 322; 51 Pac. 496.
Compiled Laws, Colorado, 1921, Sec. 1798.

IX.

Litigation, foreclosure, changes of ownership, are vicissitudes to be considered in judging reasonable diligence.

Trowell v. Bijou, 65 Colo. 202, 208; 176 Pac. 292, 294.
Water Rights Crab Creek, 134 Wash. 7; 235 Pac. 37, 41-42.

X.

Pendency of the former suit until late 1922 prevented earlier completion of collection ditch of tunnel project.

Wyoming v. Colorado, 259 U. S. 419, 495; 66 L. Ed. 999.

Summary of the Argument.

1. The State of Colorado has always been willing to cooperate with the officials of Wyoming in efforts reasonably designed to re-assure Wyoming authorities as to the quantities of water diverted in Colorado from the Laramie River.

2. Colorado's measuring devices for trans-mountain diversions from the Laramie River are standard and adequate for such purpose; and the records sufficiently full and complete to determine the amounts of such diversions.

3. The defendant has not diverted from the Laramie River in any year since the entry of the decree in the former case in excess of 33,500 acre feet of water allocated for trans-mountain ditches with the exception of a comparatively small excess in 1929.

4. Defendant has not consumptively used and depleted the Laramie River at the State line for both trans-mountain and meadow land uses in excess of 37,750 acre feet, plus the Wilson Supply appropriation, for either of the years alleged in the bill, except a comparatively small excess in the year 1929.

5. Laramie-Poudre tunnel "project," appropriation includes West-side Ditch. Colorado has not through the Laramie-Poudre project diverted in excess of 15,500 acre feet. The bill does not allege West-side Ditch from Rawah Creek is an unlawful diversion. It is a part of the Laramie-Poudre project. It is not new, it has not lapsed. Diversion records of this project are fair. Its weir is standard, reliable, properly located. Complainant has full access to it and other measuring devices and records.

6. Colorado has not by meadow land diversions in Laramie Valley withheld to exceed 4,250 acre feet.

7. The Skyline Ditch Diversion is not excessive.

8. The Bob Creek, The Columbine Ditch and the Lost Lake System, as proposed to be operated (without in any year exceeding the amount of 37,750 acre feet allocated to Colorado) are not "illegal" diversions.

9. The Wilson Supply Ditch has been adjudicated in Colorado, and its rights were determined by this Court in the Modified Decree of October 9, 1922, and no enlargement of such ditch has been made since that date.

10. The Wilson Supply Ditch has not deprived the Meadow Lands on Sand Creek in Wyoming of water to which they were entitled.

11. The State of Wyoming has no cause for complaint by reason of alleged decrease in the annual stream flow of the Laramie River, since such decrease is not due to increased uses of Colorado appropriators, but to natural causes.

ARGUMENT.

I.

The State of Colorado, through Its Responsible Officials, has Always been Willing to Co-operate with the Officials of the State of Wyoming in Efforts Reasonably Designed to Reassure Wyoming Authorities as to the Quantities of Water Diverted from the Laramie River in Such State.

Under point 9 of complainant's brief, it is in effect urged that the evidence taken on the hearing before the Commissioners shows that the Colorado officials have refused to co-operate with officials of the State of Wyoming in making an inventory of the quantity of water diverted from the Laramie River to the Cache la Poudre water shed in Colorado.

On the contrary, we respectfully submit that a careful examination of the testimony adduced before the Commissioners discloses that the State of Colorado, acting by its proper officials, was at all times entirely willing that such a co-operative investigation be undertaken, provided the work was properly supervised so as to adequately protect the interests of all parties concerned.

The desire of Wyoming for such an investigation was first officially called to the attention of Mr. M. C. Hinderlider, State Engineer of Colorado, by the receipt of a letter from the State Engineer of Wyoming, Mr. Whiting, dated March 8, 1928 (Complainant's Exhibit No. 22; and found at page 992 of the Record).

This letter, as construed by its recipient, makes no request for the installation of other measuring devices, but refers primarily to the making of an inventory of the water resources of the Laramie River, and to an accounting of the trans-mountain diversions from the Laramie

River Basin to the Cache la Poudre River Basin in Colorado.

It appears from the evidence (R. 403) that these two officials had a conversation with respect to the desirability of such an inventory some time near the latter part of February or the early part of March, 1928, at which time Mr. Hinderlider stated to Mr. Whiting, in effect, that he had no objection whatsoever to the State of Wyoming making measurements of such trans-mountain diversions, or going over any particular measuring or recording device, but that he did not feel it would be advisable for Wyoming to install duplicate measuring devices for the reason that duplicate records so made would not agree by reason of variation in the physical installation in the stream and would therefore lead to confusion and further misunderstanding between the States concerned (R. 404).

Subsequent to above conversation and after the receipt of complainant's letter of March 8, 1928 (Complainant's Exhibit 22) Mr. Hinderlider promptly communicated with the Colorado ditch owners concerned, respecting the request of the State of Wyoming as indicated in the above numbered Exhibit, and asked for their views with respect to the same (R. 403). The Colorado State Engineer replied on March 12, 1928 (Complainant's Exhibit 31, R. 1000-C) to Mr. Whiting's letter of March 8, 1928, advising him that he had written to the Colorado Ditch owners and stated to them that he saw no particular objection to the granting of Wyoming's request for a co-operative investigation of the trans-mountain diversions involved, and that upon receipt of replies from the ditch owners he would further communicate with Mr. Whiting (R. 403).

Thereafter on March 26, 1928 (Complainant's Exhibit 23, R. 994-A), Mr. Hinderlider replied further to the letter of Mr. Whiting, stating that a meeting of the Colorado ditch owners would be held in the office of the State Engineer of Colorado on April 5, 1928, for the purpose of

considering the request made by the State of Wyoming as contained in Exhibit 22, and invited Mr. Whiting to attend the conference (R. 405). To this request Mr. Whiting replied under date of March 31, 1928, stating that he would not attend the conference for the reasons set forth in his letter (Complainant's Exhibit 24, R. 995).

The State Engineer of Colorado, after receipt of the last above referred to letter from Mr. Whiting, in which he declined to attend the conference with the Colorado ditch owners to be held in Mr. Hinderlider's office on April 5, 1928, again under date of April 2, 1928, wrote the State Engineer of Wyoming, further explaining the purpose of such conference and urging Mr. Whiting to be present (Complainant's Exhibit 25, R. 996-A). In this letter Mr. Hinderlider stated that the basis of the request made by the Colorado ditch owners for a conference:

> "* * * was for the purpose of meeting with you and through such conference to more definitely ascertain your position in this regard, especially with respect to the method of carrying out the proposed investigation.
>
> "It is my understanding that the Colorado water users are not adverse to such an investigation, provided the method of carrying out the same eliminates any chance of duplicate observations and conclusions.
>
> "In view of the fact that it will be needful to enter upon private property to make such investigation, it will be necessary to secure the co-operation of such ditch interests, and I therefore believe such conference between you and these ditch interests needful, prior to arranging for this investigation.
>
> "I will accordingly await your further reply in this regard hoping that you may find it con-

venient to come to Denver next Thursday for such conference * * *."

On April 3, 1928, Mr. Whiting replied to the foregoing communication from Mr. Hinderlider, reiterating that by reason of pressing official duties he would be unable to attend the conference with the Colorado water users in the office of the State Engineer, Hinderlider, but stating that he had requested Mr. Follansbee of the United States Geological Survey to attend the conference (Complainant's Exhibit 26, R. 997).

Failing in his efforts to obtain the presence of the State Engineer of Wyoming at the ditch owners' conference, Mr. Hinderlider convened the conference on April 5, 1928, at which were present, representatives of the various water owners in Colorado and also Mr. Follansbee (R. 406). At the request of the Colorado ditch and tunnel owners present, Mr. Follansbee presented his plan for a joint inventory of the water diverted from the Laramie into the Poudre River and for the installation of measuring devices in the ditches by the United States Geological Survey and the furnishing of certain records. This plan was generally unacceptable because among other reasons it involved turning over to an outside agency, namely, the United States Geological Survey, the measurement of water originating in the Laramie River Basin, and the measurement of water in the Cache la Poudre Basin by another agency, the State Engineer, and that such dual plan would lead to confusion and further misunderstandings. There was, however, no objection on the part of the Colorado water representatives to a joint investigation and inventory by the Colorado and Wyoming officials of the water diverted from the Laramie into the Cache la Poudre (R. 406 and 407).

While objecting to the plan suggested by Mr. Follansbee for the reasons stated, the Colorado water users

offered an alternative plan proposing that the State Engineers of the two States concerned inspect all measuring devices and equipment then in use, and that the owners of the works involved would make such further improvements and changes as the State Engineer of Wyoming might deem necessary in order to provide proper safeguards to Wyoming interests (R. 408). And further, that when such devices had been approved by the State Engineers of both States, joint measurements should be made of the water diverted from the Laramie, and that Wyoming should at all times have access to all equipment, automatic registers, and records of measurements and all data would be exchanged by the State Engineers of the two States.

Colorado representatives however deemed it impracticable to install duplicate measuring devices since such instruments could not be made to precisely agree by reason of varying physical conditions in connection with their installation and would necessarily lead to confusion in the records and further disagreement between the parties (R. 408). Mr. Hinderlider, testifying as shown by the record at page 408, further states that the ditch and tunnel representatives at this meeting expressed a most earnest desire to satisfy Wyoming with respect to the measurements and inventory of water diverted from the Laramie River and to assure the representatives of that State of their wish to co-operate to that end.

Thereafter under date of April 5, 1928, Mr. Hinderlider in a letter addressed to Mr. Whiting (Complainant's Exhibit 30, R. 1000-A), set forth the result of the ditch owners' meeting held on that date in the office of the State Engineer of Colorado, and again requested Mr. Whiting to suggest a convenient date at which time he could meet with the Colorado ditch owners and State Engineer to further consider the matters involved.

The State Engineer of Colorado further testifying, stated that in his opinion the plan for a joint inventory and accounting of the waters so diverted would be entirely practicable if made jointly by the State Engineers of the two States concerned (R. 408). The witness stated that he based his opinion as to the feasibility of such a joint undertaking by the two States largely upon his experience in administering the South Platte River Compact entered into between the States of Colorado and Nebraska in 1923, and the La Plata River Compact entered into between the States of New Mexico and Colorado in the year 1922. He stated that he had, as State Engineer, administered both Compacts on behalf of Colorado since the same had been in effect in co-operation with the State Engineers of the other two States concerned and that no material question had arisen relative to the accuracy of the measuring devices, stream flow or ditch diversions during that period (R. 409).

This witness further testifying states, that Mr. Whiting, the State Engineer of Wyoming, did not elect to accept the alternative plan suggested by the Colorado ditch owners and officials and that he made no written reply to the request for a further conference as proposed in his letter of April 5, 1928 (R. 409).

Notwithstanding that State Engineer Whiting failed to make reply to the request for a further conference, the State Engineer of Colorado made a further effort to resume negotiations in a letter dated May 2, 1929, addressed to Mr. Whiting in which the former suggested the desirability of a conference to further consider the matter of diversions from the Laramie River and offered the Colorado State Engineer to go to Cheyenne, Wyoming, for that purpose (Complainant's Exhibit 28, R. 998-A).

A conference was later held in Cheyenne, Wyoming, on May 7, 1929, which was attended by the legal and engineering representatives of both States. The discus-

sion at this conference covered both the interpretation of the decree of this Honorable Court, and the matter of making an inventory of the diversions from the Laramie River to the Colorado ditches in the Cache la Poudre River Basin (R. 415). At this conference, Colorado again offered to co-operate with Wyoming with respect to working out a satisfactory plan for measuring trans-mountain diversions. Wyoming was again assured that their officials would have free access at all times to the records, measuring devices, automatic registering charts and all other available data, and that Colorado would gladly make any improvements in such equipment as Mr. Whiting, the State of Wyoming might feel advisable and would furnish Wyoming officials the daily record of gauge height readings of the trans-mountain diversions (R. 416). However, Colorado's suggestions were not accepted and nothing definite resulted from this meeting. Two other conferences composed of the legal and engineering representatives of both States were held, one at Cheyenne, Wyoming, on May 20, 1929, and another at Greeley, Colorado, on September 26, 1930. At each of these conferences the discussion covered both the matter of making co-operative investigation of the measurement of trans-mountain diversions, and also the interpretation that each State placed upon the decree rendered by this Honorable Court on June 5, 1922, reported in 259th U. S. 419, as modified by the decree of October 9, 1922, and reported in 260th U. S. page 1. Colorado through its official representatives at each of these conferences offered to join in a co-operative investigation for the purpose of ascertaining the quantities of water diverted from the Laramie River but nothing concretely resulted from either of these conferences with respect to this matter (R. 416-417-418-420 and 813).

Moreover, as indicative of the co-operative attitude of mind on the part of Colorado officials and ditch owners, the evidence clearly discloses that Wyoming engineers and

investigators were given free and unhampered access to the measuring devices on the various ditches, as well as to all data and records in the State Engineer's office of Colorado even during the years they were actively engaged in the accumulation of data for use in the present suit. Deputy Engineer Drummond testifies as to inspection tests made by him on Colorado diversion works in 1928, 1929, 1930 and 1932 (R. 168, 171, 174). He states that the "Assistant Attorney General of Colorado informed me I could make any measurement of any ditch or stream I wanted to make in Colorado" (R. 180). Perhaps the most conclusive evidence in the record respecting this matter is that detailed by Wyoming's chief engineering witness Meeker, in which he said:

> "* * * I think I have at all times had free access to ascertain whatever information I wanted from the Colorado authorities * * *, and as to the records of the State Engineer's office, I have had free access. I have made very copious notes from them without interference" (R. 341).

In view of the above cited references to the testimony adduced on the hearing before the Commissioners, both oral and documentary, we respectfully submit that it clearly appears, that the officials of the State of Colorado have uniformly shown a wholehearted willingness to join with the officials of the State of Wyoming in a co-operative investigation designed for the measurement of the trans-mountain diversions from the Laramie River, and have also endeavored to give full respect and strict observance to the terms of the decree rendered by this Honorable Court in the cause herein.

II.

Colorado's Measuring Devices and Equipment Now Installed for Measuring Trans-Mountain Diversions of Water from the Laramie River Basin are Recognized as Standard and Adequate for Such Purpose; and the Records of the Water Officials are Sufficiently Full and Complete for Determining the Amounts of Such Diversions.

Complainant under Points 1 and 3, and incidentally in other portions, of its brief, challenges the sufficiency and accuracy of the measuring devices and the public records kept showing such diversions. In support of this contention complainant relies chiefly upon the testimony of her witness, R. I. Meeker, who directs his attacks primarily upon what he asserts are faulty methods of installation of equipment, and enlarges upon incidental and occasional omissions and errors made in the preparation of automatic register charts and similar records.

Notwithstanding that the State of Colorado has been willing to make any reasonable changes in equipment or methods in recording diversions which might be considered desirable by the Wyoming officials, as above discussed under Point 1, of this brief, we respectfully submit that the evidence herein detailed by thoroughly competent and qualified Irrigation Engineers, many of whom are of national reputation, overwhelmingly establishes the efficiency and adequacy of the mechanical devices now installed, as well as the reliability and accuracy within reasonable limits, of the records of defendant maintained for the purpose of recording and determining the amount of such diversions.

It will be borne in mind that the evidence herein discloses that there are six trans-mountain diversions from the Laramie River Basin, namely: The Laramie-Poudre Tunnel, Skyline, Bob Creek, Columbine, Lost Lake, Wilson

Supply Ditch (and the Sand Creek diversions, which the Court found in the former decree not to be a tributary of the Laramie River, 259 U. S., page 490).

On each of these ditches there is installed what is known as the standard rectangular flume and gauge rod at the side, with the exception of the Laramie-Poudre Tunnel which, since May, 1927, has been equipped with an improved type known as the Parshall Venturi Flume. The tunnel, Skyline and Sand Creek are equipped with an automatic recording device known as the Bristol Register, and the Columbine, Bob Creek and Lost Lake ditches each has the Stevens type of automatic register installed. (R. 805, 812.)

In referring to the value to be placed upon the records made by these automatic registering devices, M. C. Hinderlider, State Engineer of Colorado, states that:

> "The charts from all the registers in question constitute a record as good on the average as those ordinarily obtained from such equipmement under similar conditions" (R. 813).

And, testifying with respect to the automatic charts filed in the State Engineer's office, he says:

> "There are some discrepancies in these automatic charts but discrepancies covering a series of years will creep into records of any kind wherever they may be obtained and under any one's supervision * * * taken by and large such records will give an accurate record of the discharge made by the various ditches with a reasonable and proper degree of accuracy in view of the field conditions which prevail at the points where such records were taken." (R. 812; fol. 1851.)

C. L. Patterson, an engineer of wide experience and recognized standing in irrigation matters, testifying in behalf of defendant states:

"In my opinion based upon investigations of dozens of installations and what might be said to be hundreds of practical tests, the Parshall Flume is an excellent device for the measurement of stream flow." (R. 722; fol. 1615.)

In respect to the installation of the Parshall flume this witness further states:

"As to the installation of this measuring device at the Poudre Tunnel there was an error made in its original setting in connection with the gauge * * *. The correction due to the error in installation was made on June 16, 1927, approximately three weeks after the device was installed. The site where the installation has been made was created by nature and it is high up on a mountainside and straight sections on any of these mountain ditches is rarely available and in spite of disturbances due to deposits or bends above the point of installation, the device itself works under the conditions prevailing there" (R. 722 and 723).

And, in referring to the interpretation of Complainant's Exhibit No. 60, prepared by Wyoming's witness Meeker, he says:

"In my opinion it does not show divergencies and wide variations and disagreements, but on the contrary I feel the information itself indicates that the Parshall flume for the entire period since it was installed in 1927, with the partial exception of one month, July last past, has made a consistent and accurate record of the discharge of water from the tunnel" (R. 714).

And with respect to the recording devices covering diversions made through the Skyline Canal, this witness states:

"The Skyline measuring device is a standard rectangular flume * * *. It is equipped with standard automatic registering device located on as nearly a straight section of the ditch as could be found. The repeated meter tests of this flume show that periodically sand accumulates in it but in spite of these shifts in the discharge conditions, the record may be termed fairly good" (R. 724).

And in giving his estimate of the reliability of the measuring equipment now installed on the Sand Creek Ditch, Mr. Patterson further testifies as follows:

"That Mr. Meeker mentioned (in his testimony) the existence of the automatic register and of the shifting conditions due to sand, but apparently forgot to describe the flume in the Sand Creek ditch which is well located in a straight section of the ditch and of good concrete construction and where conditions for water measurements are good if not of a higher standard" (R. 725).

He further states that:

"Including all the trans-mountain ditches and considering them as a whole, I would class the record as good * * *. I am perfectly willing to admit that there are defects and imperfections and still I feel taking it as a whole the record properly should class as good" (R. 727).

R. J. Tipton, Irrigation Engineer, and fully qualified by his large experience in irrigation matters, particularly in the State of Colorado, testifying concerning the measuring devices and records states:

"In my opinion taking into consideration the physical conditions that exist at the outlet of the tunnel and the shape, direction and operation of the channel leading to the flume, I would say that

the Parshall flume is the best measuring device that could be made use of under the physical conditions" (R. 836).

And further testifying as to his estimate of the value properly to be placed upon the measuring devices in the various trans-mountain ditches and the records made in connection therewith, this witness states:

> "I think the Sand Creek, Skyline ditch and the automatic recording devices are entirely adequate to serve their purpose if properly maintained * * *. I have examined all the automatic register charts pertaining to Sand Creek, Skyline and Laramie-Poudre Tunnel in detail for the purpose of using those charts to compute the amount of water diverted by those ditches. In my opinion in general, the charts are sufficiently complete and accurate for the determination of the discharge of the diversions from the Laramie River" (R. 841).

E. B. House, Professor of Irrigation Engineering at the State Agricultural College of Colorado, and of wide and varied experience both from a practical, as well as from the academic point of view in irrigation matters, testified:

> "It is my opinion that the equipment and recording devices (on the Skyline ditch) are adequate in every respect to assure proper measurements of water passing through the flume * * * and register charts on file in the State Engineer's office furnish a good record within practical limits of accuracy of the flow of water from the Skyline ditch" (R. 758).

And further testifying this witness states:

> "I have examined the automatic register charts of the Laramie Poudre Tunnel on file in the office

of the State Engineer and it is my opinion that those charts constitute a record of the flow of water through the Laramie-Poudre Tunnel within reasonable limits of accuracy" (R. 760).

And again:

"It is my opinion that the Parshall or Venturi measuring flume and the automatic register charts on file in the office of the State Engineer for Colorado give sufficient information to enable one to ascertain the discharge of water through the Laramie-Poudre Tunnel within practical limits of accuracy and that this information can be obtained from the records on file in the office of the State Engineer" (R. 761).

This witness also stated with respect to the dependability to be placed upon the Sand Creek ditch measuring devices and records that:

"The structure is placed in a straight section of the ditch and is in my judgment located in the best position possible on that ditch. It has a Bristol automatic register installed * * *. I have examined the automatic register charts from the Sand Creek rating flume on file in the State Engineer's office and it is my opinion that those charts constitute a fair record of the water diverted through the Sand Creek ditch * * *" (R. 761).

In explaining the rating as to accuracy, to which these various ditch records are entitled, this witness further states, in effect, that the United States Geological Survey classifies as "excellent" records relating to water measurements where the error is less than 5%; as "good" where the error is less than 10%; as "fair" where the error is less than 15% and as "poor" where the error is more than 20%:

"In view of this classification of the United States Geological Survey I would classify the records of the trans-mountain diversions by the Laramie-Poudre Tunnel as excellent; * * * the diversions made by the Skyline as excellent; * * * and those of the Sand Creek or Wilson Supply system as excellent" (R. 840).

H. L. Potts, Civil Engineer for the Denver Water Board and in immediate charge of Denver's gauging stations maintained in the South Platte, testifying says:

"The Parshall flume is a very accurate measuring device and practically fool-proof * * *" (R. 745).

"In my opinion the present measuring flume at the Laramie-Poudre Tunnel is the only device for properly measuring water at that point under the physical conditions that there exist. * * *" (R. 751).

"While I would not say that the installation at the Laramie-Poudre Tunnel is an ideal one, I do say that it is within practical limits of accuracy * * *" (R. 757).

"I believe that I have examined all the old automatic register charts for the Laramie-Poudre Tunnel * * * and while I would not say that the records are good I feel that taken as a whole a fair field measurement can be determined. By fair field measurement I mean within a reasonable degree of accuracy" (R. 750).

And in placing his estimate with respect to the reliability and value of the measuring devices on the Skyline ditch this witness states:

"I also visited the flume at the Skyline ditch and observed the physical conditions that existed.

The measuring device or flume on that ditch is a standard stilling well, and a Bristol water gauge" * * * (R. 751).

"In my opinion based upon my examination of the charts and rating tables I would say that the amount of water diverted by the Skyline ditch can be ascertained within reasonable limits" (R. 752).

And further testifying with respect to the Sand Creek diversions he states:

"On this same trip I visited the Sand Creek ditch * * * the location is as good as could be possibly found in that canal. It is equipped with a stilling well and an automatic Bristol recording gauge which is standard equipment" (R. 752).

"I have examined complainant's Exhibits Nos. 67, 68, 69, 70 and 71, which are the automatic register charts on Sand Creek ditch for the years 1923 to 1928, inclusive, and while I could not grade those charts quite as high as the charts for the other two stations, yet I would say that by an examination of each individual chart I feel that they constitute a fair record. * * *

"I have also examined the automatic register charts at the Sand Creek rating flume for 1929 to 1932, inclusive. I would say that as to these charts they constitute a fair record a little bit better than the ones previously mentioned" (R. 753).

George M. Bull, consulting engineer for the Water Board of Denver, who has had extensive experience in water problems, testifying says:

"In my opinion the measuring devices on those several ditches (Laramie-Poudre Tunnel, Skyline and Sand Creek) ought to be checked over carefully in the spring against freezing and frost and also

> have careful and systematic metering because of possible deposits of sand, and if so, I would say that they are proper and adequate measuring devices and they compare favorably with similar devices maintained by the Denver Water Board" (R. 767).

Louis L. Stimson, an irrigation and drainage engineer of long experience with Colorado irrigation conditions, testified:

> "I would say that that flume (Sand Creek) is in good condition for the measurement of water and in fact is as good a rating flume as I have ever read. The flume is * * * well located and everything is in good condition accurately to measure the water" (R. 781).

Ralph L. Parshall, Senior Irrigation Engineer for the Bureau of Agricultural Engineering, United States Department of Agriculture, located at Fort Collins, Colorado, and of large experience, both as College Instructor and as an Investigator of Agricultural Engineering problems relating to irrigation, testified concerning the reliability of the flume installed at the tunnel outlet. This witness, while disclaiming that the idea upon which this measuring device is based was original with him, yet the record shows that by reason of his extensive investigations and improvements in the design of the device, the flume has become universally known as the Parshall or Venturi flume and is so recognized by American Society of Civil Engineers (R. 627). Besides some 2500 of this design of flume being used on the canals and ditches in the State of Colorado, it is also widely used in many of the Western States and several hundred have been installed in the canals of the Hawaiian Islands, as well as numerous installations in the ditches and the canals of South Africa, Argentine Republic, Honduras, Peru, British Columbia and Russia (R. 628).

The Parshall flume was first installed on the Laramie-Poudre Tunnel outlet in May of 1927, and by reason of a faulty installation there resulted an error of .16 of a foot above the proper gauge heights; the error was discovered about three weeks later on June 16, 1927, and the fault corrected. Even during this period between the installation and the time of the discovery and correction of the error, this witness states that it would have been entirely possible for an engineer to determine by reference to the earlier charts the true gauge height, and therefore the correct discharge then being made by that flume (R. 631).

In appraising the reliability of the flume installed on the Laramie-Poudre Tunnel outlet, this witness testified as follows:

> "The operation of the Laramie-Poudre flume is remarkable under the conditions as evidenced by the measurements shown in defendant's Exhibit E-1 (R. 1494-A). In my opinion taking it throughout the season, I am absolutely convinced that the flume installed at the outlet of the Laramie-Poudre Tunnel operates well within the practical limits of accuracy even though it is hampered by debris from the channel. It is remarkable even under such conditions as existed that it stays so close that I think with ordinary care it would be practically well within the limits of accuracy. I don't know any other measuring device that could be used there to better advantage" (R. 635).

It is worthy of note in the consideration of this matter that Wyoming witnesses fail to suggest any practical plan or change which should be made in the equipment on any of the diversion works in Colorado, that would result in more accurate measurements made by any such ditches.

Complainant further suggests on pages 17 and 47 of its brief that the persons employed as readers of the mechanical measuring devices are not sufficiently experienced and competent to properly discharge their duties.

In this connection the Court's attention is called to the testimony of witness McAnelly at page 684 of the Record wherein he details the duties required of the gauge readers, and in which he says that the duties do not require a man of technical training nor necessarily of previous experience, but that in his opinion the only qualifications he considers necessary to make a competent gauge reader are that he be conscientious in his work and follow the instructions given him with respect to reporting the flow of water as recorded on the charts in 24-hour periods (R. 684). This witness then refers to the gauge reader on each of the diversions, Tunnel, Skyline, Sand Creek, Lost Lake, Bob Creek and Columbine, and states that each is fully competent to meet the requirements of his particular position.

Likewise, defendant's engineer witnesses, Professor House, Potts and Field, testified that after interviewing the gauge reader at the Tunnel, Skyline and Sand Creek ditches they considered such employees intelligent and fully competent to discharge the duties pertaining to their employment (R. 750, 752, 753, 760 and 828).

Complainant in its brief, on page 47, makes the bold and daring statement that "all automatic chart records of trans-mountain diversions from the Laramie River in Colorado were destroyed." Stated thus without qualification or explanation, such statement carries with it an evil and sinister implication that cannot be permitted to stand unchallenged. The statement, as broadly made, is not only unsustained by the facts, but is affirmatively disproved by the testimony of complainant's own witnesses. Wyoming's chief witness, Mr. Meeker, as well as other of her witnesses, made use of hundreds of automatic charts in

the preparation of this case, which were supplied by Colorado, and concerning which Mr. Meeker testified in effect that he was given unhindered access by Colorado authorities (R. 341, 365).

The only semblance of fact on which such statement could be based is the testimony of Wm. J. McAnelly, Commissioner of Water District No. 3, wherein he stated that "I burned all the accumulation that I had in the box up to 1925. * * * I had them in a box in the basement, and they got wet, mildewed, had coal dust on them and I just put them in the furnace" (Typewritten Record, page 1530, and Record Abstract 690). These old charts that were burned included not only those from the ditches here involved, but also from other ditches in that water district concerning none of which ditches was there any litigation then pending (R. 690).

However, all the information contained in the burned charts had theretofore been copied and was included in the written reports forwarded by the water commissioners to the State Engineer's office, and were then on file and available to any one desiring to examine the same (R. 691, 694). Prior to the year 1925, there was no requirement that the automatic registering charts be sent to the office of the State Engineer, but from 1926 all such charts were required to be forwarded to that office, and were accessible to and made use of by the complainant in the preparation of its exhibits in the present case (Typewritten Record, pages 1530, 1531).

In view of the overwhelming weight of the testimony as given by above named engineers, whose experience in irrigation problems, both practical and academic, accords to them a standing and value which cannot be challenged, we submit that the sufficiency and reliability of the measuring devices installed on the several trans-mountain diversions in Colorado ditches and canals, the competency of

the employes in charge of such devices, as well as the dependability of the records evidencing such diversions, is clearly and fully established.

The labored attempt of the complainant by minute and painstaking detail to discover and display before this Honorable Court some incidental and slight irregularities and omissions in the great mass of records evidencing the Colorado diversions from the Laramie River Basin is wholly insufficient to justify any serious question as to their authenticity, and its challenge to the reliability and dependability of Colorado's measuring devices and records must completely and utterly fail.

III.

The State of Colorado has Not Diverted from the Laramie River in Any Year, During the Eleven Year Period Since the Entry of a Decree in the Former Case, in Excess of 33,500 Acre Feet of Water as Allocated to Colorado for Trans-Mountain Ditches, with the Exception of a Comparatively Small Excess for the Year 1929.

By making use of all automatic register charts, rating tables, water commissioner's weekly reports, and all other available records in the State Engineer's office in Colorado, relating to the administration of the several trans-mountain diversions from the Laramie River to the Cache la Poudre Basin, the authenticity of which records is established by the engineer witnesses, whose testimony is referred to under Point II of this brief, independent computations were made showing the total diversions by each of such ditches for the years 1922 to 1932, both inclusive. These computations and tabulations were made by R. J. Tipton and C. L. Patterson, whose experience, qualifications and professional standing, respectively, are detailed at pages 504 to 508 and 696 to 699 of this record.

At page 1615 of the Record appears defendant's Exhibit J-3, prepared by witness Tipton, which gives a summary of the total trans-mountain diversions made to the Cache la Poudre Basin for the years 1922 to 1932, inclusive. In column 8 of this Exhibit is found the total for each of the above years, including the Sand Creek diversion which is not a tributary of the Laramie River. The mean diversion with such inclusion for the above years is shown to be 30,236 acre feet (R. 856).

In column 9 of the Exhibit is given the total yearly diversions with those of Sand Creek, excluded. This in detail shows the annual diversion to have been for 1922, 24,081 acre feet; 1923, 29,088 acre feet; 1924, 18,160 acre feet; 1925, 27,082 acre feet; 1926, 26,735 acre feet; 1927, 31,559 acre feet; 1928, 30,949 acre feet; 1929, 35,593 acre feet; 1930, 22,259 acre feet; 1931, 17,508 acre feet; 1932, 32,640 acre feet, with a mean or average of 26,878 acre feet for the period of eleven years which is only 80% of the 33,500 acre feet designated in the former decree as strictly trans-mountain allocation to the State of Colorado (R. 856).

As above indicated an entirely independent investigation and computation was also undertaken by C. L. Patterson, Engineer, for the purpose of ascertaining the annual and total diversions for the period 1922 to 1932, inclusive, from the records and material in the State Engineer's office in Colorado, the final results of which are substantially in accord with those arrived at by witness R. J. Tipton.

It will be noted witness Patterson finds the average of all trans-mountain diversions for the eleven-year period, including Sand Creek, to be 30,293 acre feet (R. 720), while witness Tipton finds the average for such diversion to be 30,236 acre feet. Similarly Mr. Patterson's computations, excluding Sand Creek diversions, show an average for the

eleven-year period of 26,908 acre feet, while Mr. Tipton finds the average to be 26,878 acre feet (R. 856). Both engineers agree that all combined diversions from the Laramie River and its tributaries for the eleven-year period have not exceeded 80% of the 33,500 acre feet allocated by the former decree (R. 720-721).

It is true that it appears from the testimony of complainant's witness, R. I. Meeker, that he arrived at a total diversion for all trans-mountain diversions for the year 1926 in excess of the 33,500 acre feet allocated for such ditches (R. 376-377, Typewritten R. 189, and Complainant's Exhibit 3, R. 974).

An examination of that testimony, however, discloses that his computation is based upon a report not required by statute, which purports to show the diversion made by the Laramie-Poudre Tunnel from March 1 to October 1, 1926, to have been in the amount of 13,572 acre feet, when in fact the diversion made by the Tunnel for 1926 was at least 5,000 acre feet less, as is fully discussed under Point 5-B of this brief in connection with Tunnel Project, and by defendant's Exhibits T and J-3 (R. 1467 and 1615).

The relatively small excess which occurred during the year 1929 which was inadvertently permitted by the State Engineer of Colorado represented a run of a very few days at the close of that season. This excess amounted to about 2,093 acre feet, or about 6% of the total permitted trans-mountain diversions of 33,500 acre feet, or if the meadow land consumptive use of 4,250 acre feet be included in the calculation, the excess would amount to about 5½% of the total authorized diversion of 37,750 acre feet (Def. Ex. J-3, R. 1615). In this connection, State Engineer Hinderlider testified that the comparatively small excess in the diversions of 1929 was an "inadvertent" and unintended oversight. That it was his purpose to strictly comply with the terms of the decree, and to deny diversions to Colorado ditches in any amount over

the total allocation authorized by the decree in the former case (R. 818).

A further examination of defendant's Exhibit J-3, column 3, found at Record page 1615, discloses that not once during the eleven-year period 1922 to 1932, inclusive, did the diversions of the Laramie-Poudre Tunnel exceed or even equal the allocation of 15,500 acre feet apportioned by the 1922 decree of this Court to the State of Colorado for that appropriator. The mean or average yearly diversion for that project for that period was 7,894 acre feet. It is true that the Skyline ditch, column 3, of this Exhibit, is shown to have diverted in five of the eleven years in excess of the 18,000 acre feet mean named in the decree, but average or mean for the full period of eleven years since the entry of the 1922 decree shows 17,808 acre feet, which is well within the desginated 18,000 acre feet referred to in the decree. Likewise the computations made by witness Patterson discloses that the average Skyline diversion for the eleven-year period amounts to 17,941 acre feet (R. 718).

The computations made by both engineer witnesses agree that the average total diversions made by all transmountain ditches, exclusive of Sand Creek, are less than 27,000 acre feet, or about 80% of the 33,500 acre feet allocated by the decree (R. 720-721).

It seems to be a fair and reasonable assumption from the facts which were before the Court at the time of the rendition of the decree in the former case that it was intended that the limitation of 33,500 acre feet for transmountain diversions, particularly as applied to the Skyline ditch, should be based upon an average or mean appropriation, rather than upon a strict limitation to 18,000 acre feet for each individual year.

In this connection it will be recalled that the Court had before it in the former suit defendant's Exhibit 124,

which set forth the diversions of the Skyline for a sixteen-year period, 1899 to 1913, inclusive, during seven years of which period the annual diversions were in excess of 18,000 acre feet and four years of which were in excess of 22,000 acre feet. During the balance of said sixteen-year period, the annual diversions were sufficiently low so as to bring the mean or average for the period to about 18,000 acre feet. The Exhibit No. 124, in the former case, is now included in defendant's Exhibit M-3 (R. 1619) and testimony of defendant's witness Tipton in respect thereto is found at page 861 of the Record. If the diversions had been strictly limited to 18,000 acre feet in any one season the mean diversion for the period 1899 to 1913 would have been about 16,700 acre feet, or an average of approximately 1,300 acre feet less per year than the 18,000 allocation as set forth in the decree (R. 862).

Since the entry of the 1922 decree, as indicated by defendant's Exhibit M-3, the mean annual diversion of the Skyline was 17,808 acre feet. If the Skyline diversions had been strictly limited to 18,000 acre feet in any one year during the 1922 to 1932 period, the mean annual diversions would have been about 16,650 acre feet, or approximately 18,000 acre feet.

Inasmuch as this Honorable Court had before it in 1922 defendant's Exhibit 124, which showed annual diversions for seven of the sixteen-year period in excess of the 18,000 acre feet and presumably upon that basis fixed 18,000 acre feet as an equitable and proper allocation to the State of Colorado, when considering the requirements of the Skyline Ditch, it must have intended and contemplated that such figure was an average yearly use and not a strict limitation to 18,000 acre feet for each year.

A contrary interpretation, such as is urged by the complainant herein, would result in unfairly depriving the State of Colorado and its trans-mountain appropriators of a portion of its fair and reasonable use of the water

which Colorado appropriators had enjoyed prior to the filing of the former suit, and which the Court recognized as a prior use (R. 733-861-862).

In this connection we desire to further emphasize the fact as disclosed by the testimony of defendant's engineers Patterson and Tipton, that the average total trans-mountain diversions of Colorado users for the period of 1922 to 1932, inclusive, have been only 80% of the 33,500 acre feet named in the decree of this Court (R. 721-855 and Def. Exhibit J-3, p. 1615).

IV.

The State of Colorado has Not Consumptively Used, and Thereby Depleted the Laramie River at the State Line, for Both Trans-Mountain and Meadow Land Uses, in Excess of 37,750 Acre Feet, Plus the Wilson Supply Appropriation, as Recognized in the Former Decree, for Either of the Years Alleged in the Bill of Complaint, Except a Comparatively Small Excess in the Year 1929.

The complainant under Point III of its brief urges that the State of Colorado through its recognized appropriators, and principally as a result of its meadow land diversions, has very largely exceeded the amount of diversion authorized by the decree of this Court in the former case.

On the contrary, the defendant asserts that under a reasonable and logical construction of that decree, this Honorable Court intended to, and did, allocate to the State of Colorado, for the use of its appropriators, a total or mass allocation of 37,750 acre feet, plus the Wilson Supply appropriation, rather than strictly limiting the amount for the use of the individual ditches specifically to that itemized in the decree.

The reasons underlying this interpretation of that decree are, first, that this Court announced in said opinion that the action involved was not between individual appropriators, residing on opposite sides of the interstate line, but rather *was an action between sovereign states* (Wyoming v. Colorado, 259 U. S. 468, 286 U. S. 509), which represented and spoke for the individual water users residing within the respective bounds of the two litigating states. And second, the Court determined what, under the evidence, it deemed to be an amount which the State of Colorado could fairly and equitably "withhold" from the State of Wyoming, which amount it fixed at 37,750 acre feet annually, plus the Wilson Supply appropriation. In other words, the Court, speaking through its decree, was dealing not with individual ditch owners, but rather with sovereign states and upon that basis fixed Colorado's allocation at a definite amount of 37,750 acre feet per year, leaving the matter of apportionment to individual Colorado ditches to the proper State authorities as a matter of internal administration. In determining the total amount that the State of Colorado could justly "withhold" from the State of Wyoming, it was of necessity proper and imperative that the Court should take into consideration the individual appropriators and their respective dates of priority, but only for the purpose of determining the total or mass allocation which should be decreed to the State of Colorado. It is perfectly obvious that upon the Court reaching a conclusion that Colorado was equitably entitled to withhold 37,750 acre feet from Wyoming, that neither Wyoming nor its appropriators would have any just concern or interest in the manner of withdrawal or extent of use by individual appropriators so long as the total allocation to the State was not exceeded.

That such a construction was placed upon the decree by certain of the responsible officials of the State of Wyoming is disclosed by the testimony of M. C. Hinder-

lider, State Engineer of Colorado, in referring to matters under consideration at a conference of the legal and engineering representatives of the two states held at Greeley, Colorado, in September, 1930. At that conference, the then Attorney General Wilson of Wyoming was asked in effect if he construed the Court's decree to mean "that the amount of 37,750 acre feet was in the nature of a mass allocation to the State of Colorado and her agents," to which, Attorney General Wilson replied in the affirmative. And Attorney General Wilson, further responding to an inquiry, said in effect, that there would be no objection on the part of Wyoming if any of the Colorado agencies should divert in any year more than the amount designated in the decree, "so long as diversions by other (Colorado) agencies were reduced to the extent of holding their total diversion or use in any one year to 37,750 acre feet in addition to the Wilson Supply appropriation" (R. 418). The testimony of the then Assistant Attorney General Harrison of Colorado is also pertinent and corroborative with respect to this same matter (R. 418, 421).

It is further argued under this point of complainant's brief, that Colorado has permitted diversions for use on the mountain meadow lands, as determined by headgate measurements, largely in excess of the amount of 4,250 acre feet diversion as named in the former decree. This defendant, however, asserts that the evidence submitted in this case, clearly establishes that the consumptive use of water in the meadow lands and the consequent depletion of the interstate stream at the State line, has not resulted in "withholding" from Wyoming in excess of 4,250 acre feet of the waters of said interstate stream (Testimony Tipton, R. 874, and Patterson, R. 721, 728).

In this connection it is worthy to note the physical setting, the character of the soil, climatic conditions, and the limited type of agriculture which prevails in the Colorado meadow lands, all of which combine in making it im-

perative for the use of the particular method of irrigation which the evidence discloses has uniformly been employed in that high mountain valley from the time of the first settlers some fifty years ago.

The evidence discloses that the meadow lands in the Laramie River Valley in Colorado are situate in the high mountains with a varying altitude of about 7600 to 8500 feet above sea level, the irrigated land lies immediately adjacent to the Laramie River and its tributaries with a gradual slope toward the thread of the stream. The valley has a width varying from about 200 feet to approximately three-fourths of a mile surrounded on the South, East and West by high mountains constituting a closed basin which opens only to the North along the channel of the Laramie River which flows into the State of Wyoming. Testimony: M. C. Hinderlider, Roderick L. Downing (R. 396, 452). The soil is a porous, sandy mountain loam underlain with gravel, and the irrigated lands extend in Colorado for a distance of about sixteen miles south from the interstate line (R. 512, 522, 528).

The climatic conditions result in a short growing season which limits the crop produced to the single one of mountain hay, requiring irrigation by what is known as the flooding system for a period extending from about the middle of May to the middle or latter part of July, thus covering about sixty to seventy days (R. 484, 529, 768). The "flooding" method of irrigation employed in Colorado is the same as that practiced on the meadow lands in the State of Wyoming (R. 481, 485). Under this system, which is the only method that can be successfully employed on these high mountain reaches, water is turned on in the spring about May 15, and continues to gently flood the growing hay until the close of the season about the middle of July. The slope of the irrigated lands being toward the stream, together with the porous character of the soil, unite in causing practically all of the water,

other than the amount actually consumed in producing the hay crop, to return to the stream and is thus made available for Wyoming users down the stream. Testimony of Professor Keezer (R. 524), M. C. Hinderlider (R. 411, 412), C. L. Patterson (R. 729, 730), R. J. Tipton (R. 864).

In explanation of the basis for the interpretation of the decree for which Colorado here contends, the testimony of the Colorado irrigation engineers clearly shows, that in order to successfully produce a crop of hay under the climatic, soil and other physical conditions prevailing in the meadow lands, a headgate diversion of one acre foot per acre of land is wholly insufficient. And, although a much larger headgate diversion is necessary to produce a crop, such practice results in the actual consumption of only one acre foot of water per acre of land, and the stream is depleted only to that extent. This is due to the fact that the extra water diverted by the "flooding" method of irrigation returns to the stream for the use of Wyoming users with the exception of approximately one acre foot actually "used up" or consumed in the production of the crop of hay.

The above referred to testimony affirmatively shows, that not to exceed one acre foot of water per acre is actually used up in the production of a hay crop in the meadow lands, the balance in excess of that amount returning to the stream. And the further testimony of these witnesses, together with that of the ranchers of long practical experience with agricultural conditions in high mountain valleys, unite in the opinion that a limitation to 4,250 acre feet headgate diversions, as contended for by the State of Wyoming, would result in the practical destruction of farming operations in the Colorado meadow lands. In order to bring this situation concretely before the Court, we will set out an excerpt from the testimony, first, directed to the point that not to exceed one acre foot of water is actually consumed in the irrigation of one acre of

mountain meadow hay; and, second, that a limitation of 4,250 acre feet of water, headgate measurement, is wholly insufficient to irrigate 4,250 acres of meadow land:

M. C. Hinderlider, State Engineer of Colorado, testified:

> (1) "However, regardless of the amount of water diverted through the ditches for the irrigation of the meadow lands, there is only a certain amount actually consumed, the balance returns to the stream system. * * * So long as the stream is not depleted beyond 4,250 acre feet it does not appear that Wyoming has cause for complaint" (R. 411, 412).
>
> (2) "It would be utterly impossible, in my opinion, to successfully irrigate 4,250 acres of wild meadow lands by measurement of 4,250 acre feet of water at the head of those ditches" (R. 411).

And to the same effect is the testimony of C. L. Patterson, an irrigation engineer, to whose testimony reference has been made in other connections. He says:

> (1) "It is my opinion that the amount of 4,250 acre feet per annum of water naturally consumed by the meadow lands has not been exceeded. * * * That is based upon the belief that one acre foot per acre measured as consumptive use of water is reasonably adequate for the lands and crops of that valley * * *" (R. 728).
>
> "In the case of trans-mountain diversions the full amount of the diversion is consumed, so far as other appropriators on the stream are concerned, but with the meadow lands, it is only that part of the (headgate) diversion that is so taken and used as to be withheld from or not returned to the stream, which can affect the stream flow adversely to Wyoming interests" (R. 728).

(2) "In my opinion if the mountain meadow lands were limited to a headgate diversion of one foot per acre, the result would be disastrous for most of the value of the meadow lands would be destroyed; much of the acreage would have to be abandoned, and many of the residents would have to move away.

"* * * If these lands were abandoned they would revert to swampy conditions, producing willows, weeds and other non-valuable vegetation which would probably consume an amount of water so nearly equal to the present consumption as to result in little or no benefit to down-stream Wyoming users" (R. 730).

E. B. House, Professor of Irrigation Engineering, states:

(1) "In my opinion the consumptive use of water for irrigation of the meadow lands * * * amounts to .88 of an acre foot per acre per year, and I think that amount consumptively used will mature the average crop of hay raised in that locality" (R. 530).

(2) "In my opinion 4,250 acre feet of water applied to the surface of 4,250 acres of meadow lands in the Laramie River Valley in Colorado would be wholly insufficient to irrigate a crop of hay because the soil is thin and unrententive * * * it would drain so rapidly there would be little or none left to feed the grass roots. No crop could be successfully irrigated by the diversion of a quantity equal alone to the consumptive use" (R. 530).

R. J. Tipton, irrigation engineer, who has made varied and extensive studies, particularly in irrigation matters incident to conditions existing in Colorado, states:

(1) "When water is applied to land for the irrigation of a crop, a portion of the water is actually lost and does not return to the stream, and this loss is called consumptive use" (R. 513).

"* * * It is my opinion, that amount or value of consumptive use in the meadow lands of the Laramie River Basin in Colorado is less than one acre foot per acre and probably ranges between .7 and .9 acre foot per acre" (R. 517).

(2) "If the diversions for the meadow lands in Colorado were limited to 4,250 acre feet per year (headgate measurements), in my opinion, it would mean the destruction of a large amount of the 4,250 acres of meadow lands * * * because it is absolutely impossible to irrigate one acre of meadow land by the diversion of one acre foot of water" (R. 864).

To the same general effect is the testimony of Professor Alvin Keezer, Agronomist, State Agricultural College (R. 524, 525); H. L. Potts (R. 754); and George M. Bull (R. 768), all of whom are of recognized standing in their profession and thoroughly qualified to speak with respect to irrigation problems.

In the former case there was evidence in the record of the same general import as above detailed, and to the effect that the consumptive use of the meadow lands did not exceed one acre foot per acre, although many times that amount of water, as determined by headgate measurements, was diverted by the ditches. And further that there were 4,250 acres of irrigable land in the Laramie River Valley in Colorado, exclusive of Sand Creek. Testimony of John E. Fields and J. R. Wortham (Abstract of Record, Original case, page 1097, folio 3717 and 991, folio 3458). The reasonable inference from that testimony is that when the witnesses stated that it required one acre

foot per acre to produce a crop of hay on such lands, they had reference to "consumptive" use and not to headgate measurements, as now contended by the State of Wyoming.

In other words, the Court in considering such testimony for the purpose of determining what was an equitable apportionment between the two states, found under recognized rules, that Colorado could justly "withhold" from Wyoming and its appropriators, and thereby "consume" a total of 37,750 acre feet per acre, plus the Wilson Supply appropriation. It is apparent that the underlying concepts in the mind of the Court, at the time the decree was entered, was (1) to limit Colorado from "withholding" from Wyoming more than what the Court considered an equitable and a fair amount of water; and (2) to provide by the decree a reasonably sufficient amount of water for the use of the trans-mountain appropriators, and to successfully irrigate 4.250 acres of Colorado meadow lands. This is clearly indicated by the language used in the opinion, both in the original case, 259 U. S. 419, 490, and in the opinion on the motion to dismiss, 286 U. S. 494, 504. These opinions repeatedly make use of the phrases "withhold" from Wyoming appropriators, and as required "for the irrigation of that number (4,250) acres of native-hay meadows" in Colorado.

It thus appears to be a reasonable assumption from the evidence in the former case, and from the language employed in the several opinions, that both the witnesses and the Court had in mind, and were referring to the "consumptive" use of water, particularly when making reference to the meadow lands, and not to measured headgate diversions, as now insisted upon by Wyoming.

That such contention on the part of counsel for Wyoming is untenable, is further disclosed by the above quoted excerpts from the testimony of Colorado witnesses, and particularly that of Patterson, House and

Tipton. In the opinion of these witnesses, to strictly limit Colorado users in the meadow lands to 4,250 acre feet of water, as determined by headgate measurements, would result in the abandonment of much of the mountain meadow lands in Colorado. And further, that such a condition would result without any corresponding compensating advantages accruing to Wyoming appropriators for the reason that swampy, non-valuable vegetation, which would follow abandonment, would consume almost the same amount of water as is now consumed in producing a valuable hay crop, which is now grown in Colorado, without injury to Wyoming appropriators (R. 730).

Furthermore, to construe the former decree, as here urged by the defendant, whereby Colorado has the right to "consumptively" use 4,250 acre feet of water on the meadow lands, regardless of headgate diversions, is entirely consistent with the construction as applied to trans-mountain diversions. The effect of the decree in authorizing trans-mountain diversions to Colorado ditches is to authorize water in the total amount named to be "withheld" from Wyoming and consequently, so far as that State's interests are concerned, to be "consumptively" used. Such trans-mountain diversions, when made, are forever withdrawn from the Laramie River Basin, and are thereby consumed by Colorado users, and can never be returned to the stream for further use by Laramie River appropriators in Wyoming. Similarly, the amount of 4,250 acre feet of water is "consumptively" used on the meadow lands, and marks the extent of the depletion of the stream, since the excess diverted returns to the river for further beneficial use by Wyoming appropriators.

In the former case, it appeared in the evidence, and the Court so found, that the meadow land acreage in the Laramie Basin in Colorado did not exceed 4,250 acres (Abstract Record, Original case, p. 791). The testimony in the case at bar discloses that a complete plane table survey

was made by defendant's witness, Downing, commencing in August, 1931, as a result of which he found the total irrigable acreage, exclusive of Sand Creek, in the Laramie River Basin in Colorado to be 4234.5 acres (R. 442, 449, Defendant's Exhibit I, page 1402 A). Although Wyoming's witness, Meeker, did not fully accept the Downing map as being complete, another witness for Wyoming, John A. Whiting, testified that the acreage involved "was approximately 4,200 acres" (R. 219, 901). From this testimony, it clearly appears that there has been no enlargement or extension of the users of water in the Colorado meadow lands beyond the acreage shown by the evidence at the time of the former decree (R. 454).

It thus is shown by the evidence, that Colorado's trans-mountain diversions, discussed under Point III of this brief, did not exceed in any year of the eleven-year period since the entry of the former decree, a total of 33,500 acre feet, except a comparatively small excess in the year 1929. Adding to the trans-mountain allocated diversion of 33,500 acre feet, the 4,250 acre feet consumptively used in the meadow lands, Colorado, and its appropriators, have not consumptively used in excess of the total allocation made to the State of 37,750 acre feet of water with the exception of the year 1929.

V.

A. The Laramie-Poudre Project Comprises the Laramie-Poudre Tunnel and West Side Collection Ditch.

This system of appropriation in Colorado consists of the collection ditches and reservoirs and the tunnel which, together, divert and conduct water from the Laramie into the Cache la Poudre River. It was the subject of the previous suit, 259 U. S. 419, 260 U. S. 1, pending from 1911 to decision on modified decree October 9, 1922. There the

Court found its priority of appropriation related from construction work begun in late October, 1909. It had not yet been fully completed, nor had any water been run through it at the conclusion of the testimony in the former case in 1914. (Record there 453-4, 572, 5[illegible]45.)

It was a very expensive construction, having cost, for tunnel, lining, collection ditches and diversion works, upwards of $1,000,000. This cost was raised mainly by bonding the lands of the farmers of the Greeley Poudre Irrigation District, but in later years, in money and in their own work, by contributions from its stockholders, as a reorganized cooperative mutual irrigation company.

The former suit, in its bill of complaint, sought an injunction against diversion of a 71,000 intended acre feet appropriation by this system. It specifically mentioned the West and East Side Ditches and McIntyre Ditch with the tunnel as the works (Record there 9). During the pendency of that litigation its prosecution was largely suspended, except for partially lining the tunnel and construction of temporary diversion dam and inlet ditch to the Laramie River portal of the tunnel.

The troubles of the District followed institution of the suit. It brought on much lien litigation and foreclosure suits. A reorganization was necessary into a mutual irrigation company, which was done in the years following the 1922 decision. Through deeds from the District in June, 1925, and from the sheriff in December, 1925, the title was passed to the Laramie-Poudre Irrigation Company, the mutual organization. This company is comprised of members who exchanged their equities in the property for shares, of which the Irrigation District became the chief shareholder. The lien holders took shares for their liens. As a mutual irrigation company the appropriators more actively thenceforth advanced its completion.

The West Side or Lower Rawah Ditch had been fifty per cent completed in disconnected portions by 1913. The final right of way map for it, showing its intended completion, was filed in 1917 and approved May 5, 1924 (Ex. J, R. 1406). Preparatory work for its completion was undertaken and begun in 1928. It was completed to carry water from Rawah Creek in 1929 and 1930. Water was run through it in 1929, and from it through the tunnel in 1930. (O'Brien, R. 565, 571.)

In view of the magnitude of the work, the difficulties of mountain ditch construction, remote works, then lack of roads, short construction seasons at altitudes of 8500 to 9500 feet, intervention of the World War, with pre-war and post-war high costs and suspension of like works during our own participation, the severe agricultural depression following 1920, the serious threat upon this water right, cost of litigation and loss of credit from the long sustained litigation from 1911 to the end of 1922 in the Supreme Court, the consequent lien and mortgage foreclosures, we maintain not merely reasonable, but remarkable diligence and continuity of purpose and effort has been shown in completing the enterprise.

(1) WHAT IS DESIGNATED IN THE PLEADINGS AND EVIDENCE AS THE LARAMIE-POUDRE TUNNEL APPROPRIATION MEANS THOSE DIVERSION WORKS IN COLORADO COMPRISING ONE SYSTEM OF COLLECTION DITCHES OF WHICH THE TUNNEL IS A PART AND FOR WHICH IT IS THE CONDUIT TO THE POUDRE. IT IS THE LARAMIE-POUDRE PROJECT.

The tunnel is only a conduit. It gathers of itself no considerable amount of water although it gains a small seepage along its course. The water is collected and diverted and brought to the tunnel by its feeder cut from the river and by its system of collection ditches which intercept the water of the Laramie, and of its tributaries, and so deliver into the tunnel. That has always been the obvi-

ous plan and purpose of the collection ditches and works (Meeker, R. 333-335, 323, 325).

In its brief complainant separates, for argument, the tunnel and West Side Collection Ditch. We shall treat them together as the works for diversion, actual construction of which was begun in late October, 1909. The Court found and held that was the date for relation of the appropriation of "the so-called Laramie-Poudre property," "what is designated in the pleadings and evidence as the Laramie-Poudre Tunnel appropriation." 259 U. S. 496, 260 U. S. 1.

No issue is made in the Bill that the West Side Ditch is an additional or unlawful diversion under the decree here, otherwise, in certain particulars, alleged to have been violated.

But since complainant's brief argues it, and the taking of evidence was only in the nature of a deposition, with no opportunity to anticipate such claim, it seems well to here answer that argument.

(2) THE LARAMIE-POUDRE TUNNEL APPROPRIATION FROM RAWAH CREEK AND OTHER TRIBUTARIES OF THE LARAMIE IS NOT ADDITIONAL.

On page 13 of its brief, Wyoming specifies:

> "The questions now to be considered are limited to a construction of the former decree * * * (2) whether or not Colorado is entitled to divert the waters of Rawah Creek and other tributaries of the Laramie River under additional appropriations if the combined quantities diverted and taken from the Laramie River to the Cache la Poudre River, via the tunnel, do not exceed annually 15,500 acre feet; * * *"

The Lower Rawah or West Side Collection Ditch, the diversion from Rawah Creek and other tributaries of the

Laramie River, via the tunnel to the Cache la Poudre River is not "additional appropriations" and such terminology cannot make it so. It is an afterthought, not in the Bill of Complaint.

Both States have here appealed to the record in the former suit. The complaint (Rec. there 9) specifically complained against this diversion to be made by the "Rawah or West Side Ditch gathering water from McIntyre, Rawah, Mill, Fall and Rapid Creeks, six miles long, commenced about December 1, 1909." The answer there, of Colorado (Rec. there 33), and of the appropriators (Rec. there 42), described the undertaking as "a collection system for gathering the upper water of the river and its tributaries, a reservoir for impounding the same and a tunnel of about 12,000 feet in length for carrying the same." They were the very means of diversion for which the tunnel was to be the conduit. Designating them as the group of works by which Wyoming was apprehensive the flow of the Laramie would be depleted at the State line, the suit was brought to restrain that specific diversion project, then under construction.

This system of collection ditches, by which the water was to be gotten to the tunnel for carriage was particularly the subject of evidence as well as of pleading from which the decree resulted. The Laramie-Poudre Tunnel, as the most distinctive element, was the naturally apt, short, designation of that one of the several parts there enumerated in the bill of complaint and in the evidence. The context shows the whole diversion was meant.

The modified decree, 260 U. S. 1, identified it as "what is designated in the pleadings and evidence as the Laramie-Poudre tunnel appropriation." Reference to the pleadings and to the evidence shows the collection ditches from the Rawah and other tributaries of the Laramie were "what

is designated in the pleadings and evidence as the Laramie-Poudre tunnel appropriation."

The collection ditches were referred to as the means of appropriation in the opinion leading to the original decree, 259 U. S. 419, 490, 66 L. Ed. 999, 1023.

The opinion on motion to dismiss, 286 U. S. 494, 498, 76 L. Ed. 1245, 1247, recites:

> "The corporations, with Colorado's authority and permission, were proceeding to divert water from the Laramie in Colorado and to conduct it through a proposed tunnel into the valley of the Cache la Poudre in Colorado, there to be used in irrigation. The project was designed to divert from the Laramie 56,000 acre feet per annum at first and 15,000 more later on. The purpose of the suit was to prevent the proposed diversion, • • •"

and throughout seems to have no doubt but that the proposed diversion comprehended the intended means of diversion, the collection ditches. Without the collection ditches such a diversion was not possible, nor is even 15,500 acre feet diversion possible. Rec. Stimson, 461, O'Brien 565, Smith 554, Coy 579.

The average annual diversions for the eleven years from 1922 to 1932, inclusive, was 7,847 acre feet as computed by Patterson (R. 716), and 7,797 acre feet as computed by Tipton (Exhibit D-3, R. 1611). The first year the flow approached its maximum of 13,762 acre feet was in 1932.

In arriving at the measure of 15,500 acre feet for this project in the apportionment made between the States, the Court took care to explain, in assurance to the two States, as quoted on page 42 of complainant's brief, that the Colorado appropriations "will not be affected by any variation in the yearly flow but will receive their full measure

of water in all years." 259 U. S. 419, 485, 66 L. Ed. 999, 1021.

It plainly was intended the collection works could be proceeded with so that full measure of water could be received.

Complainant's brief, in referring to the appropriations of the tunnel project repeatedly describes it as an appropriation limited to the "headwaters of the Laramie River and its West Fork" and tries to show the Rawah and other tributaries tapped by the West Side Collection Ditch are a different supply. The phrase is volunteered. The decree did not in such language circumscribe the tunnel source of water. The West Side Ditch is six miles long. It is at the headwaters of the Laramie. But the attempted limitation is not the words of the decree

At page 26 of her brief, Wyoming concedes:

> "The tunnel, as an agency of the contemplated Laramie River system, was not intended to appropriate any water, but to receive and carry the water appropriated by all the various separate appropriations composing the project" and refers to complainant's Exhibit No. 82, R. 1147.

In concluding its argument under the separated head "the West Side Collection Ditch," at page 27, Wyoming's brief states:

"There is no appropriation to the Laramie River system" and again cites its Exhibit No. 82 as the evidence on which complainant relies. This Exhibit was incomplete, the testimony of one witness only, A. I. Akin, in proceedings in water adjudication of Laramie River priorities in Colorado. The remaining portions of that finding and decree proper to an understanding of what the local court found and adjudicated there was introduced by defendant as Exhibit H, R. 1299, 1927.

The same witness, Akin (R. 583-588) testified:

"I have been practically connected with the Greeley-Poudre or Laramie-Poudre project from 1902 up to this time. I was one of the original organizers of the first company and then I was with them right along up until now. I had charge of the field work and the construction nearly all the time up to the last few years." • • • "I know what comprised the system in 1911 when the Wyoming suit began and what comprises it now. It is the same. In 1911 it was carried on as an irrigation district enterprise and now it is a mutual irrigation company, owning the same works." • • • "The Laramie-Poudre tunnel project, in 1911, consisted in digging the ditches on the Laramie River side of the tunnel and the distributing ditches on the plains and the reservoirs. I had to do with locating a means to collect water from the Laramie River through engineers. The purpose, as to the means by which water was to be diverted from the Laramie River and the works were by building the West Side and East Side Ditches, the Upper and Lower Rawah Ditches and the tunnel. The tunnel itself was not capable of collecting a large amount of water, having in mind 15,500 acre feet, it could not be done."

"In the surveys I had to do with there was included the West Side Collection Ditch running to the tunnel." • • • "I know the West Side Collection Ditch is now completed. There has been no change practically in the method of getting water to the tunnel out of the Laramie River watershed from what was planned in the original project. It is the same line.

"The outcome of the Wyoming suit caused reduction in the manner of proceeding to completion

of work of the Laramie tunnel project. The outcome of that suit caused a change in the manner of completion of the Laramie-Poudre tunnel project, because we had to cut down the acreage in the irrigation, but so far as ditches to conduct the water, we did not make any change. The company has not been able to finish the whole system." • • •

"There has never been a year since I have been connected with the project and knew anything about it that there has not been some work done in the development of it, both in the years 1915, 1916 and 1917, they put in some new headgates over there, and they strengthened that intake ditch from the west fork of the Laramie down to the tunnel."

(3) FINDINGS AND DECREE IN WATER ADJUDICATION OF LARAMIE-POUDRE PROJECT.

Other pertinent general findings, in the adjudication proceedings, R. 1299-1302, are for convenience, in part here reproduced:

"The Greeley-Poudre Irrigation District, a quasi-public or municipal corporation, duly organized under the laws of the State of Colorado, is the owner and claimant herein of a general system of ditches, reservoirs and a tunnel now in process of construction in Water District No. 48, for the diversion, storage and conveyance of waters of the Laramie River and tributaries to the Cache la Poudre River, whence the same will be diverted into and carried, stored, and distributed and applied by means of a system of ditches and reservoirs in Larimer and Weld Counties, owned by the District, for the irrigation of 125,000 acres of land. • • • The Greeley-Poudre Irrigation District. The system of works, in Water District No. 48, shall be hereinafter designated in this and special findings as the 'Lara-

mie River System' of claimant and consists of the following several units, each of which is to a greater or less degree interdependent upon the other units operated therewith, all of which, working either alone or in conjunction one with another, constitute a complete system of works, the operation of each and all of the several units being necessary for the diversion and storage of water by the entire system: The Rawah Ditch; the Rawah and Lower Supply Ditch; the McIntyre Ditch; the Deadman and Nunn Creek Ditch; the Laramie River Tunnel; the Link Lake Reservoirs, Nos. 1 to 14 inclusive; and the Tunnel Reservoir. * * *"

Here follow recitals of obstacles to be overcome, rock work, costs there above ordinary, in getting in supplies and machinery, in getting and keeping labor force due to remoteness and short season for work, partial suspension since 1911 caused by the litigation by Wyoming involving the right to divert the waters of the Laramie by this system, and, in view of them, the exercise of diligence.

"This general finding shall apply to the whole system and each unit thereof and is made to avoid repetition insofar as possible. It shall apply to the several units of the system hereinafter enumerated, without special findings or reference hereto in the findings for each unit, and shall be taken as incorporated in and as a part of the findings for each unit.

"Each of the several units, while interdependent in large measure upon the other units of the system, nevertheless involves diversions from different tributaries of the Laramie River and is segregated into specific names and findings for the purpose of this decree. Each unit is given the same date of priority, and although different priority numbers

are given, nevertheless each unit of said system shall have equal priority with each of the other units thereof" (R. 1299-1302).

The decree, in its general provisions and special parts, was in accordance with said findings (R. 1363, 1376, 1381).

(4) TUNNEL AND COLLECTION DITCHES ARE ONE PROJECT AND TOGETHER FORM THE TUNNEL PROJECT OR APPROPRIATION.

In the former decision, Wyoming v. Colorado, 259 U. S. 419, 459, 66 L. Ed. 999, the Court in defining appropriation, recognized the doctrine of relation.

Wyoming was accorded the benefit of this doctrine of relation in 259 U. S. 490, and it was applied as to the diversion "spoken of in the evidence as the Laramie-Poudre tunnel diversions" and as "the Laramie-Poudre project."

The Court (p. 490) proceeded to examine and determine what was the true date of priority, "by relation," making no mention of the date of priority it had been awarded in the local courts under the laws of Colorado, which had related it to August 25, 1902.

> "The Laramie-Poudre project is composed of several units, originally distinct which underwent many changes before they were brought together in a single project. In its final form the project is intended to divert water by means of a tunnel from the Laramie River into the Poudre watershed, there to unite that water with water taken from the Cache la Poudre River, and then to convey the water many miles to the lower part of the Poudre Valley, where it is to be used in reclaiming and irrigating a body of land containing 125,000 acres. It is a large and ambitious project, whose several parts, as finally brought together (p. 491) are adjusted to the attain-

ment of that purpose. The parts were separately conceived, each having a purpose of its own. The project is now intended to draw on two independent sources of supply, each in a separate watershed. The appropriations are necessarily distinct. Neither adds anything to, nor subtracts anything from the status of the other. We are concerned with only one of them."

The Court so proceeds to consider only the Laramie project and treats it as *one* project, as distinguished from the *other*, or Poudre, unit or project. So considering it, and whether the one it was concerned with could be related to the part known as the Rawah or Link Ditch, the Court rejected that as not including, in 1902, a concept of getting the water into the Poudre by a tunnel, but through the Skyline, and continues:

• • • • •

"The plans were examined and re-examined, alternative modes and places of diversion were considered and investigated, particular features were eliminated and others added, and in 1909, but not before, the project was definitely brought into its present form" (p. 492).

• • • • •

"The tunnel was merely a mental conception until 1904. In March of that year a survey was made of a tunnel site, a ditch from the west fork of the Laramie to the east fork, and a channel reservoir on the east fork above the tunnel site. • • • Later, in 1904, a survey was made of a tunnel site, three collecting ditches and two pipe lines. • • • And so other plans, an alternative of a ditch around the mountains through a portion of Wyoming and back to Colorado, which would avoid the construction of a tunnel, through 1905 to 1908, are delineated (pp.

493, 494) to point out that, until the vote of the irrigation district to contract with the company to complete it and to issue the district bonds for the construction, in October, 1909, followed by actual work about the last of that month of boring the tunnel and making the diversion was begun, 'it was all in an inceptive and formative stage—investigations being almost constantly in progress to determine its feasibility and (p. 495) whether changes and alternatives should be adopted rather than the primary conception. It had not reached a point where there was a fixed and definite purpose to take it up and carry it through. An appropriation does not take priority by relation as of a time anterior to the existence of such a purpose. * * *'

"No separate appropriation was effected by what was done on the upper Rawah Ditch.

"The purpose to use it in connection with the Skyline was not carried out but abandoned. This as Link testified was its 'principal' purpose. The purpose to make it an accessory of the large project was secondary and contingent. Therefore the work on it cannot be taken as affecting or tolling back the priority of that project.

"Actual work in making the tunnel diversion was begun, as before shown, about the last of October, 1909. Thereafter it was prosecuted with [illegible] diligence, and in 1911, when this suit was [illegible], it had been carried so nearly to a state of completion that the assumption reasonably may be indulged that, but for the suit, the appropriation soon would have been perfected. We conclude that the appropriation should be accorded a priority by relation as of the latter part of October, 1909, when the work was begun." 259 U. S. 495.

Thus it is seen that the use of the words "appropriation," "project," "diversion" in connection with Laramie-Poudre, in the pleadings, evidence opinion and decree, all refer to what was then well understood, the appropriation from the Laramie River by works which were to divert the water for carriage out of the Laramie Valley into the Poudre; namely, the Collection Ditches specifically complained of in the Bill of Complaint, one of which is the West Side Collection Ditch. Wyoming well concedes the tunnel of itself does not collect any water. It would be futile without its accessories to capture the water.

In its well studied complaint here, brought late in 1930 after all these years of attention and study of the Laramie River controversy, Wyoming significantly made no specification of the West Side Ditch completion work, then and in 1929, going on notoriously to it and to all the world. No evidence was offered to dispute the continuity of purpose or effort, reasonableness of its completion to beneficial use, in view of this suit, the war, the depression, the difficult physical conditions, the distress of the farmers under it whose arid lands were bonded and incomplete in adequate water.

As Wyoming's brief concedes the West Side Collection Ditch is not designated in the Amended Bill of Complaint. But we differ with the novel contention first made in the brief, page 23, "nor did any appropriation of water from Rawah Creek receive recognition in the former decree," and "the use of this ditch is a new appropriation, not authorized by the former court decree. * * * it has no connection with the Laramie-Poudre tunnel appropriation."

The decree, 259 U. S. 496, characterized it as "The Laramie-Poudre project," the modified decree as "what is designated in the pleadings and evidence as the Laramie-Poudre tunnel appropriation"—which means the project

to *divert* the water by the diversion works, i. e., the collection ditches, and to *conduct* it through the proposed tunnel. Not the tunnel alone, as the conduit, but the *means* of *diversion* was what was being complained against, was sought to be restrained, and was adjudicated there.

(5) INDEPENDENT ENTITY AND APPROPRIATION LAPSE NOT SHOWN BY WITNESS COY'S TESTIMONY.

Wyoming's brief, p. 23 concedes:

> "The West Side Collection Ditch was commenced prior to 1910 in pursuit of the purpose to construct a system of ditches to collect the water of various streams tributary to the Laramie River," then goes on "under separate appropriations, although each proposed appropriation was to be a part of the Laramie-Poudre project." "The West Side Collection Ditch or Lower Rawah Ditch, as now constructed as an independent entity (citing testimony of Mr. Coy, R. 581), is the consummation of a purpose to divert the waters of Rawah Creek and other tributaries of the Laramie River emptying into it below the point of diversion of the Laramie-Poudre Tunnel appropriation after the original and, also, the second proposed plan of diverting the water of this stream had lapsed for more than twenty years."

Coy, the Laramie-Poudre construction engineer, also testified (R. 580-582):

> "When I answered that the Rawah Ditch as now built is an independent entity, I did not mean that it is a separate thing from the tunnel project. It is a part of the tunnel project. The Lower Rawah Ditch and the Upper Rawah Ditch and the East Side Collection Ditch are all a part of the tunnel project and they are all interdependent, a combination for the diversion of water from the Laramie River. The

tunnel carries the water after it is collected by the ditches.

"The Rawah Ditch did not then constitute an independent entity. It was always a part of the tunnel system.

"Under the original plans water went directly to the tunnel.

"The result of that lawsuit limiting the possible diversion from the tunnel of 15,500 acre feet did not cause an abandonment of the project, but they did not get the amount of water they originally contemplated. The 'Tunnel Project,' 'Greeley-Poudre Project,' 'Greeley-Poudre System,' is the idea of collecting all this water and taking it through. As to whether it was built by various independent appropriations to convey water to the tunnel, they were all decrees of equal standing" (R. 582).

As to lapse, in complainant's brief first suggested, Coy said:

"That work had to stop at the end of 1911 until after the litigation is completed. Other litigation in the way of lien foreclosures arose as the result of this after 1911. There were a multitude of liens of contractors and engineers and people who worked who filed liens for the amounts due. They continued until after the conclusion of the suit of Wyoming against Colorado. Then they were turned into shares of the mutual irrigation corporation now operating the system. * * *" (R. 582.)

There was an injunction sought from the highest Court of the land and the case was pending for more than eleven years which caused a hiatus, but there was no lapse in the continuity of purpose.

Coy also testified to due diligence in completion of the project for diversion from the Laramie by the tunnel and ditch (R. 580).

Other witnesses testified that the West Side Collection Ditch was a part of the tunnel system in 1909, that its purpose was to divert the water of tributaries at the headwaters of the Laramie to the tunnel mouth, and that it fulfills the same purpose now. (Akin, R. 585, O'Brien, R. 573, Mosier, R. 540.)

The West Side Collection Ditch is not a new ditch. It is a part of the Laramie-Poudre tunnel appropriation.

Engineer L. L. Stimson, who was for many years Chief Engineer of the Greeley-Poudre Irrigation District and the Laramie-Poudre Companies (R. 445-476), testified (R. 460-462):

> "About 1913 the tunnel was complete enough to take water from the Laramie and a ditch was put in across the valley intercepting a number of small streams to the West Laramie, about a quarter of a mile. In completing the West Side Collection Ditch in 1929 and 1930, it was run from the west end of this ditch across the Laramie Valley to Rawah Creek, about 29,000 feet. It had been half completed from Rawah Creek before. The lines were followed almost exactly as laid out by the Company's engineers in 1909 and 1910. There was a slight variation in substituting flumes by going around three tunnel sites, otherwise it was constructed on exactly the lines of 1909 and 1910. It goes to Rawah Creek at the same place. The 1909 and 1910 work was by hand work of men spread over four or five miles of the total ditch upon sections not joined. Because of the machinery used, it was necessary to start the 1929 work at the lower end where it joins the ditch that was built across

the valley. We had been operating that ditch and tunnel since about 1914, which only collected the waters of the West Fork and incidentally of the upper Rawah Ditch, which came into the West Fork several miles above the mouth of the tunnel. During all those years the District and Company have never been able to get their 15,500 acre feet of water.

"On Exhibit 'A' attached to the Amended Bill of Complaint, what is there designated 'Link Ditch' is the upper Rawah and the West Side Collection Ditch and East Side Collection Ditch, and so designated, are a part of the Laramie-Poudre project."

Note: The map as attached to the Amended Bill printed in the Record, p. 50A, does not fairly show the features of the streams and diversion works on the Laramie River in Colorado. This is mainly due to mechanical difficulties in reproduction. The connections by means of streams are obscured, so that a disjunctive effect is produced.

The Link Ditch, there shown as connecting with the Skyline Ditch, in fact discharges into the west branch of the Laramie River below the Skyline Ditch and above the tunnel. Meeker (R. 371).

Engineer Stimson (R. 455-476) has given a concise description of the Laramie Valley in Colorado, beginning at the head, or Cameron Pass, and extending down to the State line, altitudes, names of the ditches, their sequence on the stream, geological features, and the climatic conditions.

As to description, he says (R. 468):

"The Laramie-Poudre Tunnel Project consists of four things—the East Side, the West Side Collection Ditches, two of them, the Tunnel Reservoir, and the Laramie-Poudre or Greeley-Poudre Tunnel.

> The Upper Rawah Ditch and Link Lakes system, are only feeders of the West Side Collection Ditch. The West Side Collection Ditch is the ditch to collect all of the waters coming to it and transmitting them to the Tunnel. The Tunnel itself collects only a little bit of seepage—in wet years as much as three feet, and in dry years a fraction of a foot."

On connection of tunnel and collection ditches and on diligence, Stimson testified (R. 469):

> "There has been continuity of work on this Laramie-Poudre Tunnel Project since 1913. From 1913 to 1917 the Laramie-Poudre Tunnel was completed and cut into from the Laramie River, and the ditch across the Laramie River was built. The length of the Tunnel is 11,256 feet. The ditch across the valley is about 1,500 feet."

Stimson then, in some detail, recites (R. 468-472) the continued prosecution of the work by the Greeley-Poudre Irrigation District farmers from 1914 to the end of 1922, their prostration by this suit, their continuity of effort on the system, its distribution and collection ditches, by private funds, and contribution of their own labor when bonds could no longer be sold after the institution of the Wyoming injunction suit, at which time half of the $5,100,000 bonds had been issued and made a lien on their lands.

The farmers themselves in this District were without much capital or credit, the land dry, unimproved. Since the trial the effort has been to complete the works and all the forces of the limited resources of the owners have been used to do so.

When the suit was determined, in late 1922, reorganization had to take place, to clear up the multiplicity of lien foreclosure litigation which had ensued during the pendency of that suit and the suspension it brought on.

The purpose to complete the project since 1913 was never abandoned.

This reorganization was promptly undertaken after the 1922 decision and about the first of 1925, the interests of landowners and foreclosure claims were reassembled in the form of a mutual irrigation company, in which the District got the majority of shares issued. The rest went to lienholders. The present company is the continuation and successor of all the rights of the District and the original company.

New cash was raised. Since 1923 there has been spent toward completion of the system over $500,000, of which $123,000 was spent on the West Side Collection Ditch and $5,000 inside the tunnel.

The war and agricultural depression, beside this suit, had their part in hampering the landowners in prosecution of this costly work.

The priorities from the Cache la Poudre River were so late as to be practically without value, making necessary the Laramie River water. It could not stop at the west portal of the tunnel. The collection ditches were necessary as well, otherwise there would not be water enough for even the much reduced acreage of the District necessitated by the conclusion of the former suit.

Then resuming, as to the West Side Ditch completion, Stimson testifies (R. 473-476):

> "In the completion of the West Side Collection Ditch as a part of the Laramie-Poudre Tunnel Project, there has not been any variation made in the purpose or accomplishment of the construction. The West Side Collection Ditch was not made to take any more water or to deliver at any different place for diversion out of the Laramie River than was the plan in 1910, 11, 12, 13, 14. The line of its con-

struction does not divert from the Rawah Creek or any of the intercepting creeks at any different points than was the plan of 1909 to 1913. In the lower part two tunnels were constructed in 1910 and the West Side Ditch runs through them. There is a 20 foot drop in the lower end of that ditch. That drop was constructed in 1910. It is exactly the same drop as was in that ditch at the former taking of testimony in the former suit of Wyoming against Colorado. The line of right of way is not substantially different. There was not included in the project as it was in 1910 and 11 any other auxiliary unit as part of the Laramie-Poudre Tunnel Project. The dam of the reservoir was about 1,500 feet north of the line of the west portal of the tunnel. The purpose was to discharge that water into the Laramie-Poudre Tunnel. No different purpose has been accomplished by the present construction of the ditch.

* * *

"Between 1914 and 1929 occurred the lawsuit of Wyoming, which changed the amount of water that the Laramie-Poudre Company expected to get from the Laramie River from about 70,000 acre feet to 15,500 acre feet, and therefore it was necessary to cut the construction of the Tunnel Reservoir as it would cost too much money as a conduit to the West Portal of the Laramie-Poudre Tunnel. There was substituted, at least temporarily, the building of about 2,000 feet of ditch connecting the completed portion of the West Side Collection Ditch with the ditch that had been built in 1913 and 1914 across the Laramie Valley.

"The high water line of the Tunnel Reservoir as then projected is above the lower end of the West Side Collection Ditch. The water would have flowed across the tunnel reservoir and reached the same

point as now. I had to do with obtaining the rights of way for the tunnel system. I have seen all the maps that were filed in the U. S. Land Office, showing the right of way and the application for right of way. I myself made the map that was filed in 1917 and approved by the Land Office in 1924, which is the last map. (See Exhibit 'J,' R. 1406). There was not in either of those maps a difference with respect to where the water of the lower end of the West Side Collection Ditch was to lead directly into the Tunnel. * * *

"Defendant's Exhibit J, sheet 1 (printed at R. 1405), is the map 'Laramie Tunnel Ditches and Feeders by the Laramie Reservoir and Irrigation Company,' * * * approved March 29, 1909, by Assistant Secretary of the Interior.

"The other three sheets are entitled 'Map of Amended Survey of Partially Completed Portions of the Laramie Tunnel Ditches and Feeders,' showing it was filed December 29, 1917, with the Register of the United States Land Office at Denver, and approved May 5, 1924, by the Department of the Interior, * * * showing the lines of the right of way of the original location and completed portions and partially completed portions of the Laramie Ditches and Feeders.

"Referring to the later map, * * * it shows that the West Side Collection Ditch, and the East Side Collection Ditch both come to the West Portal of the Tunnel.

"Between the two maps the actually constructed location of the tunnel line was changed, so that the west end was thrown to the south, and changed its length from something over 15,000 feet to something over 11,000 feet." (Note: The tunnel bore was completed in 1914 or earlier.)

"This second map of the amended survey, partially completed portions of the Laramie Tunnel, Ditches and Feeders, shows what were the completed portions up to 1917. * * * Where it is completed, it is designated by a double line, one of which is the location of the ditch, and the other solid line to designate completed portions.

"There has been no change in the projected collecting means of the Laramie-Poudre project of the Laramie River. Had the Tunnel Reservoir been built, the system, with the reservoir, would take more water from Wyoming than does the present system, on account of the evaporation from the surface of the reservoir. The reservoir covered about 200 acres, and the evaporation off that reservoir would be much greater than it is in the three-quarters of a mile of ditch that was necessary to take the water around and through the tunnel or reservoir site to the Laramie-Poudre Tunnel" (R. 475-476).

If corroboration of continuity of purpose from 1914 were needed, these maps show that during the years 1916 the survey for it was made and in 1917 the amended map was filed to correctly show and obtain approval of right of way for the completed portions as the tunnel and collection ditches had been partially constructed and were then intended to be completed.

Meeker, Wyoming's expert witness in this, and the former suit, here testified relative to the unity of the tunnel and collection ditches:

"The purpose of the West Side Ditch was to collect water and carry it to the tunnel. * * * Such canal could not be used for any other purpose. Whether there were a pond or reservoir across which the water would run to the tunnel, or whether it would run in an excavated conduit it would not

make any difference in the accomplishment of the purpose.

"The West Side Ditch was half finished in 1913 on practically the same line. It runs through the same small tunnels. It is rough mountain territory with considerable rock work" (R. 333-5, 323, 325).

"The decree of the United States Supreme Court awarded the amount of 15,500 acre feet annual diversion, through the tunnel. I presume that these two collection ditches were a part of that project, and were so noted upon the maps attached to and made a part of the bill of complaint and the answer in that original suit" (R. 334).

And, referring to the record in the former case at page 4361, there, printed page 1285, Meeker recalls that for that case he prepared a graph, Exhibit U-3, in which the Greeley-Poudre works were divided into three parts and he there stated, one of which, "the Laramie River system is indicated in green and is a collection system of canals and trans-mountain tunnels," and he then said "the Collection system of canals and trans-mountain tunnel is a third unit" (R. 334-335).

This suit was costly. It engaged the attention of the appropriators under it for nearly twelve years. It sought to restrain and enjoin the entire Laramie-Poudre project diversion. As soon as the ban of this suit was lifted and its affairs could be consequently readjusted, the construction was resumed on the tunnel project by the district farmers now as a mutual company. Other witnesses than Coy, skilled as engineers and as men well experienced in large irrigation construction and in reasonable prosecution of appropriations in Colorado and Wyoming, testified that the work of appropriation by the West Side Collection Ditch as part of the tunnel system was prosecuted with reasonable diligence in view of the obstacles met. (Stimson,

R. 469, Mosier, R. 540, O'Brien, R. 566, Smith, R. 548-551, Akin, R. 584-588, Moore, R. 588-591.)

Wyoming's brief, p. 25, states "the ditch was not constructed until 1931. There was no construction work between 1913 and 1930." This is not strictly true. Work was kept up on the tunnel project in 1914 and succeeding years, in a limited way, it is true, but after the decision work was continued with the same purpose as fast as obstacles could be cleared away. The purpose was never relinquished. Obtaining right of way was kept up during the litigation by amended maps for corrected right of way. Exhibit J, R. 1406, 475-476. (Approved May 5, 1924, held up until this litigation was decided.) Preparations were made in 1928 and actual construction began in a big way in 1929.

With necessity for substantial amount of water from the Laramie River, also a Colorado stream, costly and arduous diversion to be built, the farmers had to band together in a district first, a mutual irrigation company when the district was less able to accomplish a cooperative effort; they had to pool their efforts for irrigation of their new lands, they were handicapped by extraordinary obstacles of litigation attempting to restrain the diversion and obstacles of war and unprecedented agricultural depression. All these things enter into consideration of what is reasonable diligence. Must it be said it should have been accomplished sooner under the obstacles confronting the users—the farmers under it? Is such diligence elsewhere shown in either State in the same period, that the completion of the West Side Ditch must be condemned as not reasonably diligent?

The Court, 259 U. S. 419, 496, awarded specifically 15,500 acre feet as "subject to this junior appropriation in Colorado," "by means of or through the so-called Laramie-Poudre project." This was to the collection ditches and tunnel designated in the pleadings and evidence.

(6) AUTHORITIES IN SUPPORT OF DECREE AWARDED TO THE LARAMIE-POUDRE TUNNEL SYSTEM.

That the decree awarded the Laramie-Poudre Tunnel system in the Colorado Courts for its priority of appropriation is conditional is set up by Wyoming. This is no vice—the Colorado laws have long recognized conditional decrees of appropriation for water rights.

> Waterman v. Hughes, 33 Colo. 270, 80 Pac. 891.
> Water Supply and Storage Co. v. Larimer & Weld Irrigation Co., 24 Colo. 322, 51 Pac. 496.
> Confirmed by statute, Colorado Compiled Laws, Sec. 1798.

Litigation is one of the difficulties to be considered in judging reasonable diligence and is an element excusing what otherwise would be apparently delay. In re Water Rights Crabb Creek, 134 Wash. 7, 235 Pac. 37, 41-42.

Foreclosure and changes in ownership are vicissitudes to be given consideration. Trowel Co. v. Bijou, 65 Colo. 202, 208, 176 Pac. 292, 294.

The decree of 1922 recognized the tunnel project appropriation as dating from 1909, by doctrine of relation.

> "As between different appropriations from the same stream, the one first in time was deemed superior in right, and a completed appropriation was regarded as effective from the time the purpose to make it was definitely formed and actual work thereon was begun, provided the work was carried to completion with reasonable diligence." 259 U. S. 419-459.

The United States Supreme Court, 259 U. S. 419, 495, recognized that the pendency of the former suit had prevented completion.

B. The Laramie-Poudre Tunnel Diversion of 1926 Did Not Exceed Decree. The Records are Fair in Reporting Diversions.

The allegation of diversion of more than 15,500 acre feet in the year 1926 was not sustained.

Wyoming's brief, pp. 16, 17, tells the Court:

> "There can be no doubt that water was in the year 1926, being taken, without any record thereof being made, from the Laramie River to the Cache la Poudre River via the Laramie-Poudre Tunnel diversion, which together with the recorded flow, made a diversion for the year in excess of 15,500 acre feet."

And cites Wyoming witness Meeker. This is a positive statement. The same witness retracted it.

Meeker, on further review and searching cross-examination, after 140 pages of testimony, admitted, "after lunch" and testified, that he did not find a total tunnel diversion "reported and unreported," in excess of 15,128 acre feet for the year 1926 (Meeker, R. 371).

And as to diversion "without any record thereof being made" Meeker concedes it is not more than 1,230 acre feet, and adopts Freeman's estimate to get that much (R. 371). Freeman even conceded it might not be fair.

No excessive diversion by the tunnel is claimed for any other of the twenty years since the former trial.

Furthermore, as to 1926, as elsewhere discussed, Meeker to get even an approach to 15,000 acre feet, resorted not to the record of Water District No. 3 into which the water was discharged, the record of the Division Engineer, or the record of the irrigation company, but to an annual report of Water District 48 which he discredited,

which was not required by statute and to which Colorado objected, but on which Wyoming premises her argument in her brief, page 14.

The year 1926 was one of surplus flow in the Laramie River. It was 117% of its 22 year mean, based upon the year's record (Meeker, R. 910). No shortage in Wyoming on the Laramie is specified for that year.

The Laramie-Poudre Tunnel system in Colorado however did not make a diversion of even half of its permitted amount. By no construction could the contrary be a proven fact.

There was never any question that it had so neared the 15,500 acre feet that its diversions need be the occasion of close scrutiny, either during, or at the end of the season, insofar as violating the decree was endangered.

Its diversions under its appropriations could not be figured to exceed about 7,100 acre feet for the year, whether figured from the reports in the State Engineer's office, the Water Commissioners records, and the Irrigation Company records, plus an estimated flow, in the freezing midwinter, January and February of possibly (but not more than) 500 acre feet, offset by the amount it carried late in the season, to accommodate the Skyline Ditch.

The 1926 incident does not prove a suffered or threatened injury for inadequate records as complainant's brief argues, pp. 15-16. As to the amounts cited there as shown by the witnesses McAnelly, water commissioner of District 3, for diversion into the Poudre by the tunnel, 5,644 acre feet, and computed by engineers Patterson, 6,118 feet, and Tipton 6,060 acre feet, there is no considerable variance. These were figures from May 1 to the end of the season. McAnelly's figure is brought up to about 6,000 acre feet by the customary charge (5% of the amount diverted) for losses in carriage down to the users headgates on the

Poudre (R. 435). Nor did Tipton's figure differ, for the period from May 1, to the end of the 1926 figure, from the headgate man's report (R. 856). Nor, when the 490 acre feet carried for the Skyline late in the 1926 season is excluded, is there much variance in Smith's 7,100 acre feet figure from March 23. Neither excess diversion nor habitual inadequate records is thereby proven.

Wyoming brief, p. 14, rested the proof of 1926 excess diversions upon the Mosier report. We submit that the defendant's objection to the Mosier report, as not a record required to be kept under the laws of the State of Colorado, based on no measurements and so incompetent, is good (R. 165), and that the figure, used by Meeker, is proven mistaken, as hereinafter explained. Meeker admitted it was improbable, as elsewhere here shown.

The Colorado Compiled Laws, Sec. 1704, provide:

> "It shall be the duty of the water commissioner of the district in which the water is used to keep a record of the amount of water so turned into his district from any other district."

(1) WYOMING WITNESSES, ZIMMERMAN, FREEMAN, POWELL, DO NOT SHOW EXCESSIVE FLOWS UNRECORDED THROUGH TUNNEL.

Wyoming, in assailing the Laramie-Poudre Tunnel diversions and records, lays main stress on the testimony of her three witnesses Freeman, Powell and Zimmerman, emphasizing Zimmerman. It is said they corroborate each other in showing large and excessive unrecorded diversions carried from the Laramie through the tunnel. An examination of the record does not support this.

Miss Zimmerman testified she has been running a summer resort at Home Post Office in the Poudre Canon the past ten years; that she has been since 1923 promoting

a big reservoir in the Poudre, had done nothing more on its building than dig some test pits (R. 128). When on the witness stand the third time, at Cheyenne, she admits she had been trying to sell it to the ditch companies in Colorado directly interested in this suit. That in 1926 Stephen Corlett Downey of Laramie, Wyoming, was her attorney and she instructed him to write and caused him to send to the owners of the Laramie-Poudre Tunnel and to the Water Supply & Storage Company, owner of the Skyline Ditch, and to owners of other trans-mountain diversions the threat of stirring up interstate litigation unless she shall receive a settlement. (The letter, Exhibit X-3, printed at R. 1626-A.) This letter is significant in that it just preceded the action by Whiting, the new State Engineer of Wyoming. Then she says she is a volunteer witness, has attended the entire affair of these hearings in Cheyenne, Wyoming, Denver, Colorado, and Fort Collins, Colorado (about thirty days). "My sympathies are very much with Wyoming."

> "I knew that the Laramie-Poudre Company was applying for a loan from the Reconstruction Finance Corporation, and I made some effort to prevent that. I understand I have been successful." "Defendant's Exhibit Y-3 to L. C. Moore, President of the Laramie-Poudre is in my handwriting, and that is my signature; I wanted to show him I had something to do with preventing the company getting the Reconstruction Finance assistance" (R. 955-956) (Ex. Y-3 at R. 1626-D & -E).

Her zeal was productive of the threatened expensive litigation but disclosed no violation of the decree by Colorado or by the irrigation companies who had rejected her proposed sell out of her late reservoir "filing."

Miss Zimmerman had to admit she was "not an expert on water measurements. I just took Mr. Freeman's state-

ment for that. I did not measure" (R. 129, 130). She admits the West Side Ditch had been constructed in sections beginning in 1909 and before 1929 (R. 126) but has Rawah Creek come into the Laramie two miles below the tunnel, instead of its actual more than six miles (R. 1251).

Likewise, as to the West Side Ditch (R. 126) she stated the 1929 ditch was entirely independent of that of 1909, but further said she "did not know" the plans. "I assumed that was the object" (to get water to the tunnel). "I suppose the purpose of the dam below the tunnel dam across the valley of the Laramie River to force that water up to the mouth of the tunnel."

Her generalized statements, therefore, that 3,000 acre feet were brought over by the tunnel in 1926 unrecorded, that it is a common practice of the defendant to make no record of the early and late diversions, are equally biased, unreliable and corroborate no one.

Even Freeman, whom Miss Zimmerman had hired, testified that on reconsideration he would not estimate the "unrecorded" flow out of the tunnel at exceeding 1,230 feet to February 27. Then he admits (R. 155), from March 23 he had actual gauge readings, which he found reported in the State Engineer's office. This 1,230 acre feet unrecorded flow he assumed based on his 9 second foot measurement at the end of the warm part of a winter day, February 14, 1926. He concedes this would be higher than in some other part of the day (R. 154, 155). That might be the peak of the flow (R. 151). That there is a diurnal variation he concedes (R. 150). That the flow at that altitude and time would be highest in mid-afternoon (see witnesses Akin, R. 586, O'Brien 569, 570).

Freeman's evidence does not show any such flow unrecorded. He found a flow February 14. On February 27 he admits it was not flowing. On March 21 he found the

gates shut down and no water flowing in (R. 147). From March 23 he found the automatic records in the State Engineer's office. His estimate up to February 27 had been based on a measurement at the peak of the flow of a diurnal fluctuation in winter.

As to Powell, another employee of Miss Zimmerman, he stated (R. 159) he did not estimate the flow unrecorded prior to May 4, 1926. Between April 27 and May 4, 1926, he estimated 400 acre feet. Later (R. 159), Powell put this estimate at "between 300 and 400 acre feet." Meeker (R. 368, 370) later put it at 326 acre feet and testified the tunnel automatic register charts were on file at the State Engineer's office (R. 279).

Witness Patterson (R. 707), easily enough found these flow records in that office. It is submitted, therefore, that the testimony of the Wyoming witnesses, Zimmerman, Freeman, Powell, does not show "diversions largely in excess" of the permitted amounts, either in 1926, or any other year, that they are not based upon reliable measurements or estimates and are so general and erroneously premised as to furnish no reason to accept them instead of the Colorado Engineer's testimony that one-half the tunnel appropriation was diverted from the Laramie River in 1926. Wyoming has not been injured by any violation of the decree therein or a lack of fairly accurate record of the withdrawals from the Laramie into the Poudre by the tunnel.

(2) ANALYSIS OF TESTIMONY OF WYOMING'S WITNESS RESPECTING COLORADO'S MEASURING DEVICES AND RECORDS.

Ralph I. Meeker, Wyoming's expert, criticises Colorado measuring devices and records but his reasons are strained and his effort unnatural.

No Wyoming water official makes claim of inability to learn fairly closely from Colorado records in the State Engineer's office the amounts by which the 1926 Laramie flow was consumed in Colorado.

Wyoming's engineer witness, Freeman, found these records for 1926 (R. 155).

Meeker was disposed to hunt for things to criticise. It is not unnatural that he had a blind spot in the Colorado State Engineer's office, after he was hired by Wyoming in 1929.

Before he was hired by Wyoming and while he was under employment at State Engineer's office in Denver, in water study papers, for U. S., or for Colorado, Meeker, after 1926, easily found (R. 362, 363) and used, not the Mosier report, but the Division Engineer's records as a basis for extending on Water Supply paper 469 p. 24, the tunnel diversions for 1926.

Meeker (R. 279) testifies he has computed "from the chart records" (he found them on file in the Colorado State Engineer's office) "the quantity of water diverted, but unreported" for the period from May 1 to May 4, inclusive, 1926. He then gives this figure as 326 acre feet "unreported" by the water commissioner of District 3, *"But which is recorded on the automatic gauge height chart."* We submit that the report of the water commissioner of District No. 3, does not bear out the fact that the water from May 1 to May 4 is "unreported." It was the beginning of the irrigation season and it was averaged out for that week. Furthermore, Mr. Meeker (p. 268) had no difficulty in finding the record of it on the automatic gauge heighth chart in the State Engineer's office in Denver, so it cannot be said to be "unreported." Later (R. 369) Meeker testifies: "I determined 326 acre feet as the unreported water for the Laramie-Poudre tunnel for that year."

In testifying to the total reported diversions by the tunnel, Meeker then discards the records which he had always before been accepting, from 1926, that is the weekly records of delivery of water into District No. 3, and, in testifying to his computation for the purpose of this suit, jumps over to the annual report of Mosier, Commissioner of Water District No. 48. This he knew was not based on any measurements, inspections, or facilities for measurement within Water District No. 48. The tunnel diversion measurement is made by the tunnel caretaker, at the discharge end of the tunnel, which is in Water District No. 3. Meeker, instead, takes the estimate found in the Mosier annual report, 13,572 acre feet, and to this adds 326 acre feet. Then, to swell the sum, he adds another estimate not based on any measurements, but the estimates of Freeman. He scales the figure of "unreported" water down to 1,500 acre feet. Then he admits that although he visited the tunnel in 1926, he made no measurements, and (R. 370) admits it was improbable that 13,000 acre feet were diverted that season, but sums up that (R. 371) "I have the figures you requested before lunch. I find the flow through the tunnel in 1926 to be 15,128 acre feet. I arrived at that figure from Exhibit 3, water commissioner's report of District 48, March 1 to October 1, 13,572 acre feet—unreported, as reported by Meeker from the charts 326 acre feet; reported by Freeman 1,230 acre feet, January 1 to February 27. My unreported diversion of 326 acre feet covered the period of time from May 1st to May 4th. That could be a duplication of the 13,572 acre feet reported by Exhibit 3. I believe it would be under the circumstances—the fact that the water commissioner's report of District 48 covered the report of March 1 to October 1." So, at 15,128, he had overfigured by 326 acre feet. At R. 376 he concedes: "I found no diversion in excess of 15,000 acre feet through the tunnel."

To get his estimate of 15,128 acre feet total by the tunnel for 1926 (R. 373), the witness (so well familiar with Colorado irrigation offices) had to studiously avoid the records of its flow in the Division Engineer's office, the State Engineer's office, and in the office of the Laramie-Poudre Irrigation Company, the tunnel appropriator. He had to reject these and premise, instead, upon an annual report of the water commissioner of District 48 in Colorado who had no means to measure, never measured, or kept a record of the flow and made his report (not required by statute) on the obvious calculation mistake of an employee of the Laramie-Poudre Company.

This tunnel project appropriation was the subject of the former suit, and violation of the injunction of its decree was the main stated grounds of the present suit.

It is significant that after reviewing all the proof, Wyoming's brief, on page 19, is brought to take the position that "whether the actual amount of water diverted by the tunnel is more or less than 15,500 acre feet per annum is immaterial."

On redirect examination, in resting complainant's case in chief, witness Meeker testified regarding its exhibit, a paper (Ex. 86, R. 382), "It is not a form of report that I am familiar with and find in that office, just a blank sheet, with notations on it. This purports to be in August, to show the diversion of August 27th, 1931, through the Laramie-Poudre Tunnel, and also Lost Lake. This piece of paper shows Laramie-Poudre Tunnel, 1,641 second feet for twenty-four hours, Lost Lake, 50.7 second feet for twenty-four hours" (R. 382-384).

Then followed several pages of examination regarding this blank sheet of paper by which it was elicited, only after considerable parrying, (R. 385) that it was nothing but a memorandum which inadvertently had gotten into the State Engineer's office and in which the decimal point had been

omitted, so that 1,641 second feet, he would have given the impression to the Court, was diverted through the tunnel. He knew that was an impossible amount (R. 389) and by all other records knew the figure intended was 16.41 second feet. In a case where one State is invoking the attention of the Supreme Court in a suit against another, where experts are testifying who are well familiar with the records of the State Engineer's office of Colorado and of the Water Commissioners, it should not have required so much labor (R. 382-389).

(3) THE VARIATION BETWEEN THE STATE ENGINEER'S REPORTED VOLUME AND THE ACTUAL VOLUME DIVERTED BY THE LARAMIE-POUDRE TUNNEL IN 1926 DID NOT INJURE OR MISLEAD WYOMING.

The amount which flowed out of it was figured by G. F. Smith as 7,100 acre feet under Duvall's weekly report to the Company (Ex. T, R. 1467-1470).

Meeker admits 490 acre feet of this 7,100 were waters of the Water Supply and Storage Company run through the tunnel in late August and September, 1926, under a special agreement for that year at the time the Skyline ditch broke and was disabled, and was done only as a special accommodation (Smith, R. 552, Kluver, R. 606). That subtracted from 7,100, leaves 6,270 acre feet. A close check. Meeker, Wyoming witness, assumed that no record was kept of these diversions. Meeker finally concluded that the unrecorded portion was only from May 1 to May 5, and that 326 feet should be added to the State Engineer's records on that account. But this 326 feet was reported to the Laramie-Poudre Irrigation Company corporate successor of the District (Ex. T, R. 1408).

It is to be borne in mind, as pointed out by witness Patterson (R. 700-703) that in the Colorado water administration there are two records kept, both available to inquirers. One goes to the State Engineer, through the

local water commissioner, and the Division Engineer. The other is the record which the Irrigation District or Ditch Company itself has, through its headgate man.

Freeman testifies that he found the flow after March 23, records in the State Engineer's office (R. 155).

Any earlier flow was a relatively insignificant amount of water. Up to May 1, for the water commissioner, it was too small an amount to redivert in the canals from Poudre to the Irrigation Company. The records of the Laramie-Poudre Irrigation Company here introduced (Ex. T, R. 1467), showed that there was the amount of 10 cubic feet of water per second reported as coming out of the east portal of the tunnel from March 24, 1926, to about the 10th day of April. Then it gradually increased to about 30 second feet the end of May, but decreased, with tunnel cavein trouble and repairs to nothing July 3. Then it ran up to 60 feet about July 10, then began a gradual decline to 11 feet, the middle of August. The Skyline water then raised it again. This water was not "unreported." It was a matter of record in the State Engineer's office, the Division Engineer's office, as well as in the office of the irrigation company at Greeley.

The afternoon flow of February 14, 1926, when Freeman was there with Miss Zimmerman, 9 second feet was not proven to have all been water taken into the upper or west end of the tunnel. This water was that issuing from the east portal of the tunnel. The tunnel is two and a quarter miles long. From the swamp above it, and from accretion along its course, it collects a small amount of water from seepage which varies from three feet down to a fraction of a foot (Stimson, R. 468, Turner, R. 561, O'Brien, R. 569). So far as Wyoming has been concerned all this, the seepage from the Poudre watershed as well, has been charged to the Tunnel-Laramie River appropriation.

It is true that nine second feet of water which Wyoming's witnesses Zimmerman and Freeman say was coming out of the east portal of the tunnel, if it were constant, would make up an amount of about 1,000 acre feet in 1926 from January 1 to February 28. But it was not constant, nor at that rate of flow, nor all from the Laramie River. To assume half of that as an average flow would be liberal.

The tunnel flow was not continuous in the winter and spring of 1926. Freeman testified that he went up there on March 21, 1926, and nothing was running through (R. 152), and that there was no discharge from February 28 to March 23 (R. 155). The whole estimate of nine second feet was based on a measurement made by Freeman about 3:30 in a February afternoon. That would be at the highest point of thawing for that day in the cold winter months of that altitude, and is not proof of a nine second foot average flow night and day for every day in January, February, early March at 8,500 feet altitude.

The seepage in spring and summer months from the Cache la Poudre watershed, charged to the Tunnel as if coming from the Laramie, could be expected to offset this part of the inconsiderable, variable, winter flow from the Laramie which, in that year 1926, was not reported to the State Engineer.

The mistake in Mosier's annual report for 1926 does not show habitual unreported diversions. Clem Duvall was the caretaker of the Laramie-Poudre tunnel in 1925 and for some years previous. He died in 1925. His son, J. H. Duvall, finished out that year to December 10, 1925. His employment ceased then. It began again in March, 1926, and then ended. Mr. Parker, now deceased, then President of the Laramie-Poudre Irrigation Company was the officer who administered the water collection and distribution. Smith had nothing to do with making or keeping a record of water through the tunnel (Smith, R. 551-

553). 1925 was the mutual irrigation company's first year on the tunnel. The younger Duvall seems to have failed up to May 1, 1926, to send the daily and weekly reports of the twice daily readings of the tunnel flows to the District 3 Water Commissioner, although he did to the company. Colorado did not have a report of the early spring and midwinter flow of 1926 for the tunnel in her State Engineer's office it is true. But it was neither with design, nor with effect, to injure Wyoming.

As the statutes of Colorado required (Compiled Laws of Colorado, 1921, Sec. 1704), the records of its discharge were kept under the supervision of McAnelly, the commissioner of Water District No. 3. Mosier, the commissioner of Water District No. 48, therefore did not need to keep it and did not do so, but at the end of the season wrote G. F. Smith, secretary of the Laramie-Poudre Irrigation Company, asking the amount of the total diversion. Smith's wife had died just two weeks before and Smith was indisposed (Smith, R. 554, 556). He wrote Mosier what Duvall's weekly record showed, but in the calculation had made a mistake, not only in computation, but it appears the Duvall reports were duplicated for some days (Smith, R. 556, Ex. T, R. 1470). Smith suggested Mosier check up through McAnelly. Mosier sent in the Smith figures in his annual report to the State Engineer, without verifying them (Mosier, R. 542). Duvall could not be found at the time of the hearing, although diligent inquiry had been made (R. 552, 569, 543).

On this clerical mistake Wyoming's witness Meeker has seized. Meeker does not state that there were actually 15,500 acre feet or more diverted either by daily, or weekly records, or gauge register charts, or any estimate of flow based upon actual facts. When that question is put to him he makes an equivocal answer that he is going upon the statement of the Water District 48 annual report. This mistake was made the basis of this suit to enforce

the decree. It was refuted by the records of the State Engineer and of the Laramie-Poudre Company itself, readily ascertainable to any investigator. Such a slip, out of nearly twenty years under consideration, should not warrant the federal government stepping in to brush aside the State authorities of the State in which the irrigation diversions are being made.

From May 1, Exhibit 22, page 1577, throughout 1926, the records of the company and of the Division Engineer and State Engineer's office check as is shown by the testimony of the witness Tipton and show about 6,100 acre feet (Exs. D-3, J-3, R. 1611, 1615). For Exhibit J-3 is added the full report of diversions as made by J. H. Duvall to the company, 7,125 acre feet as calculated by Tipton. Not over 500 acre feet should be added for the winter flows of January and February.

It is the practice to read the gauge at the tunnel outflow twice daily, to send daily reports by telephone and weekly reports each Saturday, to the District 3 water commissioner and when the flow and clock automatic register is able to function (after freezing conditions are over), the weekly gauge charts. These are checked against the daily reports and any errors are corrected (McAnelly, R. 435-437). This oversight of a new employee under a new administration was not continued, but was corrected as soon as the flow became substantial. Duvall was not continued as a caretaker.

There was no bad faith shown in this 1926 incident. We submit this 1926 inadvertence, after a criticism of the entire history and records of the tunnel diversions, under the experienced and searching scrutiny of the witness Meeker with all facilities made accessible to him everywhere he inquired in Colorado, does not disclose such an equity as should require what practically amounts to the appointment of a receiver of the appropriations from the

Laramie River in Colorado and the taking of their administration from the officials of this State.

C. The Laramie-Poudre Tunnel Weir is Standard Equipment and Reliable.

Complainant's brief devotes several pages to an attack upon the reliability of the tunnel weir. This weir is located at the discharge end of the Laramie-Poudre Tunnel. It was installed in 1927 as an improvement over the former standard weir which had been located at the same place. It is described in the record by Mr. Hinderlider (R. 808 and 809), by Parshall (R. 627 and 628); Potts (R. 745). And is illustrated in the United States Department of Agriculture Bulletin (R. 1068 and 1563, Ex. U-2). It is also exhibited by photographs (Ex. W-2, R. 1563-1569).

The outstanding characteristic of the Parshall-Venturi Flume is that it is so constructed that the flow of water is speeded up over the crest of the weir where the measurement is determined and thereby gravel, rock and debris do not lodge on the flume weir crest to prevent showing a measurement by automatic registering devices, within practical limits of accuracy (Stimson, R. 803; Parshall, R. 629; Potts, R. 747-757; House, R. 759; Tipton, R. 833-834; McAnelly, R. 866). All of these witnesses have made a study of the flume and its record and given their opinion that it does throughout a season show the measurement of the water within practical limits of accuracy.

For its criticism of this weir the complainant relies upon the testimony of Meeker. We have shown elsewhere he was inclined to close his eyes to available facts. He was also inclined to assume that gravel lodges on the crest in the throat of the weir. Gravel may lodge at the entrance of the throat, but it does not lodge on the crest of this weir. It does not prevent the flume from showing a

measurement within practical limits of accuracy (Parshall, R. 629, 630, 633; Stimson, 803; Potts, 747; House, 759; Tipton, 833, 834, 838, and photos, Ex. W-2). This, though a good current meter measurement might not be made (Parshall, R. 629).

The witnesses uniformly testified that a right angle bend in the outlet flume, is enforced by the steep mountain side there. This breaks the swift flow of the water as it issued from the lower end of the tunnel. The breaking of the speed of the water does cause rock and gravel to deposit in front of the weir or at the throat, at small flows, yet this gravel does not lodge on the crest of the weir itself. Furthermore, the presence of rock or gravel in the crest of the weir would have the effect of tending to cause the registering device to over-state rather than to under-state, the number of cubic feet of water flowing through the weir (House, R. 840). It is obvious that such material would interfere with the flow of water and cause an apparent water level height in the box of the registering device which would not be flowing water, but would rather be an impediment to flowing water. The weir assumes that the water is in motion going over its crest. The right angle turn in the weir constitutes a wide stilling basin for slowing down the flow of the water as it drops out of the tunnel mouth. This tends to even up the velocity and depth as the water enters the narrowing throat of the Venturi weir. It is an improvement over the former weir and made for the purpose of accurately measuring the water there.

It is to be observed here that the Laramie-Poudre Tunnel current meter check measurements prior to the year 1927, pointed out by Meeker (R. 269, 270, 346, complainant's brief, p. 18), are those of a flume which has been supplanted by the new improved Venturi weir (Ex. 59, R. 1071). The Baily test of May 24, 1927, was of the new weir freshly installed before it had been corrected by

adjustment. They should not have weight here in discredit of the present weir.

In the case in chief there was testimony by Meeker, after Drummond was excused as a witness, that Drummond, Wyoming's Deputy State Engineer, had made a current meter check at the east portal of the tunnel at 5:30 P. M. on July 11, 1929. The record of it was not there introduced nor was Drummond asked by Wyoming to disclose its details while he was on the witness stand. It was first offered in evidence on rebuttal, and would appear to reflect upon the weir. But a search back through the records shows that (R. 341, 342) Meeker testified to the fact, but not the result, of a current meter measurement by Drummond at the East or discharge end of the tunnel on July 11, 1929 (R. 342). Meeker said: "His measurement was made above the right angle turn in the expanded channel from the outlet tunnel." Obviously this was a turbulent and unfair place near to this drop from the tunnel mouth. It must have been the same current meter record so, on the last day, offered as complainant's Exhibit 92 (R. 1206-C). There was no opportunity to cross-examine on it.

The criticisms by Meeker of the record flow of the tunnel through the automatic register devices as compared with checks by current meter tests do not disprove that Wyoming is being given full credit for all water from the Laramie-Poudre passing through the tunnel. Allowances of from five per cent to ten per cent are to be made for differences in human variations and mechanical variations in making such tests (R. 272, 840).

Wyoming's brief quotes a memorandum by Parshall it introduced on rebuttal, which had been transmitted about April 14, 1933, in some letter mailed by another writer. It was not shown this memorandum was made on that date. There was no opportunity to explain it,

but it is to be observed that this memorandum which is Exhibit 97 (R. 1209) was based only on eight current meter ratings. The latest of these was July 10, 1932. Thereafter and before he testified in June, 1933, Mr. Parshall (R. 635, Ex. E) had the opportunity to study the performance of this weir measurement by 24 current meter rating tests. These he had studied closely and correlated and he thereon confirmed the several other engineering experts who had testified that the Laramie-Poudre Tunnel weir installed in 1927, reasonably and accurately records the amount of water passing through. At record, page 634, after having discussed the different meter ratings and the things which explain the deviations of some he states:

> "In my opinion taking it throughout the season, I am absolutely convinced that the flume installed at the outlet of the Laramie-Poudre Tunnel operates well within the practical limits of accuracy even though it is hampered by debris from the channel."

As to the Laramie-Poudre Tunnel Venturi flume, Meeker concedes (R. 281): "While the improved Venturi flume is an excellent measuring device, the conditions upon which it has been installed and operated are such as to destroy its accuracy in recording diversions of water from the Laramie River." Elsewhere he conceded that out of a total of thirteen checks against it by current meter measurements it showed a deviation of only 1.5% in what it was recording as against the current meter tests of what was flowing through. His criticism of it was not borne out by the records of the average of the current meter tests against which it is checked.

Wyoming introduced Meeker's compiled table of tunnel weir variances between current meter tests and recorded flow (Ex. 30). The thirteen tests by current meter, he admits (R. 350-351), show more was recorded and charged to Colorado than actually went through. The

current meter tests showed 318.68, while the weir registered 328.68 acre feet as gone through. The variation was only 1.5% between the two methods. That was fairly close. But it demonstrated that, as an average, the current meter test against the tunnel record of flows based on the Parshall flume rating does not prove the actual flow exceeds the recorded flow, but the contrary (R. 351). He has already admitted that a five per cent variation on such tests is considered permissible (R. 343).

(1) THE PROPER PLACE TO ASCERTAIN DIVERSIONS FROM THE LARAMIE IN COLORADO WAS NOT THE ANNUAL REPORT OF WATER DISTRICT 48 BUT THE DIVISION ENGINEER'S WEEKLY REPORT.

Meeker testifies, summing up on direct examination by Wyoming, after a lengthy reiterative quoting from the books of the local commissioner of Water District 48 annual reports:

> "As indicated by the frequent references to the various field books, observations by the water commissioner in no instance, as I recall, exceeded ten visits per year and frequently fell as low as two or three visits. For this reason, the accurate determination of the amount of water diverted is not reflected in the records of the water commissioner because of his infrequent visits" (R. 317).

The tabulated annual report as Exhibit 3 (R. 974) was simply a columnar digest of the matter in the field books. These District 48 water commissioner's records were incomplete, generally made from hearsay. They misled no one.

Mr. Meeker well knew, from long experience in the office of the State Engineer of Colorado, that the daily record and register of water by scientific instruments and daily observation and report, was of water diverted out of the Laramie and into Water District 3, not measured daily on the Laramie side of the diversion by the commis-

sioner of Water District No. 48, but that such measure was always made on the discharge side, under the commissioner of Water District No. 3. It is he who must distribute it all and who must and under C. L. 1704, report weekly to the Division Engineer. He did require a daily record and made weekly report. Mr. Meeker had no difficulty in finding the weekly and annual reports thereof in the office of the Division Engineer and of the State Engineer in the State Capitol in Denver. He had used them years before (R. 362, 363), and in then making an extension on water supply paper 469, page 240, of the flows of the Laramie-Poudre Tunnel for the years 1922 to 1927 inclusive, had in his own handwriting entered and used these records of the Division Engineer, so made from the weekly reports from the District No. 3 (R. 363). It did not occur to Meeker then to look for it in the annual report of the commissioner of Water District 48. He testifies the District 48 commissioner's field book did not purport to show visits to the tunnel nor tunnel diversions (R. 348, 362).

Meeker knew the commissioner of District 48 did not measure, and in many years had not measured, the tunnel water, or attempted any daily record of it and that the District 48 annual report showed this. He did not make weekly reports (R. 372) on the tunnel. He knew that the commissioner of District 3 kept a daily reported record which he checked weekly against the automatic register sheets.

The tunnel weir at the east portal is at the only practicable location (R. 808). It is on a prominent highway over the Rockies, the "Cameron Pass" Highway (R. 559, 560), and so is very accessible—more so than if located at the West portal, at the upper end of the Laramie Valley. It is out of the mountain up a somewhat steep trail from the tunnel caretaker's house along the highway (Drummond, R. 179).

The water comes out of the tunnel at high velocity and is turned into "Tunnel Creek" with a right angle turn and an expanded basin which is to quiet down the turbulency and even its flow (Patterson, R. 739). There the commissioner of Water District 3 is the one who must measure and must keep a record of its flow. It is the better place to get an accurate measurement. The Laramie River end, through the mountain, has not a better and more dependable location for a measuring weir (Patterson, R. 740; Potts, R. 751). At the East Portal are the most approved and recent form of measuring flume—the Parshall Venturi—and two gauges, one the customary staff rod, for all seasons, and also the approved clock mechanism of an automatic register. This clock register is kept locked because it has been tampered with by meddlers (R. 569, 560). Anyone having business with the flume or gauging devices can make known his business at the caretaker's house at the road below and permission is freely given (R. 559).

(2) WYOMING'S REPRESENTATIVES HAVE HAD FULL ACCESS FOR INSPECTION OF THE TUNNEL MEASURING DEVICES AND RECORDS.

On page 17 of the complainant's brief the statement is made that "Wyoming's representative Mr. Drummond was not permitted to inspect the automatic gauge." This might be misleading.

Drummond testified (R. 171), he visited the East portal of tunnel July 17, 1929. That before Drummond had disclosed his business, Luce, caretaker, came up, Drummond paid no attention to him but went on with his measurement (hardly a good start for courtesy). When he was leaving, Luce ordered him off, and thereupon first learned Drummond was investigating for Wyoming. Then Luce called the superintendent of the Tunnel System, O'Brien. O'Brien that evening told Drummond he had

no objection to his measuring the water. Drummond came back again that day and the next (R. 171). On cross-examination Drummond admitted (R. 179-180), "It was a steep climb up to the tunnel East portal * * * I could see there was a house there that apparently belonged to the tunnel. I did not make my business known before I went up there, because I could save twenty or thirty feet of climbing by starting in up at the bridge. I was never refused permission to go up there. That evening when I called up Mr. O'Brien (superintendent) he told me to make all the measurements I wanted. * * * Two days after that the Assistant Attorney General of Colorado informed me that I could make any measurements of any ditch or stream I wanted to make in Colorado." It was a trifling incident, immediately rectified.

The record in fact shows that all of the Wyoming engineers and witnesses, Watson, Whiting, Drummond, Meeker, had the fullest opportunities to measure and check and investigate at the Colorado diversions on the Laramie River, and that they freely did so. Wyoming's representatives also have had the freest access to the records in the Colorado State Engineer's office and anywhere else they sought information. There is no contradiction of this. Meeker (R. 341) says:

> "I have at all times had free access to ascertain whatever information I wanted and measurements from the Colorado authorities."

The automatic register charts of the tunnel were on file in the State Engineer's office and different engineers investigating found them there (Meeker, R. 279; Potts, 749; House, 760; Tipton, 836-838, 848). Freeman found the records of these flows from March 24, 1926 (R. 155).

(8) THE COLORADO APPROPRIATORS FOR TRANS-MOUNTAIN SYSTEMS DO NOT UNDERSTATE THEIR DIVERSIONS.

Wyoming's brief argues, pp. 48, 49, as to these trans-mountain diversions into the Poudre, that the daily records are kept only by the appropriators themselves, that the appropriators are in charge of the diversion works. "There is no water official to be watched, because none come more than three or four times in a season, and then only to make observations."

But it is to be remembered that the water commissioner of the Poudre has the turning out of this water at the headgates therefrom to the lands of the appropriators. He must know his water receipts, he is the one charged by statute with making the record of it (C. L. 1704), and must make his "bank account" of water balance. He has daily telephone reports from each trans-mountain diversion measuring weir, and weekly gets the telltale automatic chart register sheet against which, and the water he has had available for delivery to the contending Poudre ditches, he can check the fidelity of the man at the trans-mountain weir discharging into the Poudre.

Since the water user is entitled to redivert from the Poudre only what he shows put in, it is to the self-interest of the trans-mountain water appropriator not to understate to the water authorities, but rather to stoutly claim all he may as having been diverted from the Laramie and put into the Poudre. This is not to Wyoming's disadvantage.

Wyoming's counsel in her brief recite and argue at page 49:

> "Because all of the unrecorded water—more than 3,000 acre feet in 1926, as Mr. McAnelly stated to Mr. Freeman (R. 148)—would be made available for use of these Cache la Poudre appropriators and they would only be interested in being protected

from excess diversions in the Cache la Poudre over what the record shows was diverted from the Laramie."

This argument is unsound. McAnelly did not state to Freeman that there were more than 3,000 acre feet of unrecorded water in 1926. Not even Freeman so stated it. Freeman's talks with McAnelly were but two. Both were in 1926, one in February, one in May—both so early as to refute such a statement attributed to McAnelly. Freeman's estimate of unrecorded water was 2,500 acre feet (R. 155). He admits he based his estimate upon (1) from January 1 to March 23 "the off season" a measurement of this diurnally fluctuating stream in winter—that was taken at 3:45 in the afternoon of February 14, the high point of the day; (2) from March 23 to May 5, upon automatic gauge charts (not unrecorded, however he may so designate it). He found the automatic gauge charts in the Division Engineer's office (R. 155). This was not the "off" season. It was the "on" season. Freeman says also, "I saw the gauge charts for 1926—they seemed to be kept in very good condition. I think, insofar as I could tell, the record of the gauge charts were quite accurate" (R. 149). He qualifies then, "It is recorded, but is not included in the official reports" (R. 155).

There was a good reason why there were no gauge charts for the "off" season—that up to March 23. Freeman says he was there March 21, and no water was running (R. 147). Ice conditions, also, in winter time at those altitudes prevent the operation of automatic registering devices because such instruments depend on the free action of a float which winter conditions make impractical, and as the witness Meeker admitted, such winter records are not dependable (R. 337).

The absence of "meter" measurements prior to May 25 or late in September, argued at page 20 of complain-

ant's brief, prove nothing. The flows are small outside of those dates and meter tests are not significant. To find the flume free from ice at that season, says Freeman, would be unusual (R. 150). But he assumed an even flow of the amount he found running at the end of warm part of a winter afternoon. He concedes, finally (R. 155, 156), it might not be fair. That such time of day in February would be the peak, not average flow were: witnesses O'Brien (R. 569, 570), Akin (R. 586), Turner (R. 561).

Measuring devices do not operate in winter weather in high altitudes. There are very few records of those high altitude water flows during winter months. Meeker testifies to this (R. 337, fol. 508). They tend to be grossly excessive. Ice conditions make use of measuring devices inexact while cold weather there continues. This is natural. Neither float gauges nor even staff gauges are freely then operative. Ice conditions tend to exaggerate gauge heights. But the flow is slight in such seasons and not of great consequence. Zimmerman found ice in the weir April 9, 1933 (R. 954, 955), when O'Brien, for the Laramie-Poudre (R. 569) was flushing out its intake.

Meeker, on Easter Sunday, April 16, 1933, found only 3.83 second feet running through the tunnel (R. 336-7 363). How much of this was seepage along its course is not shown. The reliance on the Baily measurement, Ex. No. 59 (R. 1071), cited by complainant's brief pages 20 and 21 does not refute Hinderlider. It was a current meter test of the new weir made when it was freshly installed, May 24, 1927, and before it had been corrected by adjustment.

VI.

The Meadow Land Diversions are Not Excessive and the Administration Thereof is Fair and Without Injury to Wyoming Appropriators.

Certain phases of this subject matter are discussed under Point IV of this brief, in connection with another proposition, and the purpose of the discussion here is to answer, somewhat in detail, the contentions urged under Point III of complainant's brief.

There were approximately seventy ditches in Colorado for irrigation of meadow lands along and close to the main stream and tributaries of the Laramie in Laramie River Valley in Colorado, as decreed priorities for irrigation therein prior to October, 1909 (R. 1220-1401. Tabulated at R. 1237-1241, 1278, 1364). In the opinion herein, 259 U. S. 419, the Court did not segregate, nor in the decree, 260 U. S. 1, itemize, the recognized amount of each of these many diversions. It was not necessary.

The use was limited to 4,250 acre feet. The Court, in the opinion, 259 U. S. 419, and in the opinion on motion to dismiss, 286 U. S. 494, cited this amount as that stated by Colorado's State Engineer, Field in the former case as the amount used. Mr. Field's testimony so referred to, was (transcript of record there, p. 1097):

> "It may be that the water is turned onto those meadows to the depth of 12 feet in the course of a season, but the consumptive use could not possibly exceed one acre foot per acre."

Plainly, the 4,250 acre feet recognized in the decree refers to the *consumptive* use, or amount withheld by Colorado by the meadow land irrigation, employed by the Court in determining the available supply in the river when existing prior uses were recognized as having been already diverted and having depleted the river at the

State line when the total remaining available supply of 288,000 acre feet was determined.

The method of irrigation of the meadows is by flooding hay fields throughout the growing season, whereby the water returns quickly to the stream. The same method of irrigation that the witnesses for Wyoming testify is employed in good husbandry in both states. Watson (R. 191 and 192), Meeker (R. 347), Akin (R. 586), Patterson (R. 728, 732), Potts R. 774). Complainant's brief, p. 29, admits this is the proper method for irrigating meadow lands.

Both states accept the figure of one acre foot per acre as the consumptive use by such irrigation of each acre of meadow lands in Colorado and those above the Wheatland Reservoir in Wyoming. (Meeker, R. 348.) Meeker has compiled a careful water supply paper arriving at this determination which is discussed by Downing (R. 453), and is shown as the defendant's Exhibit Q (R. 1463).

The acreage of meadows irrigated in the Laramie Valley in Colorado has not been increased since 1914. There was then 4,250 acres. Whiting, Wyoming State Engineer (R. 219), testified there is now approximately 4,200 acres. Watson, Wyoming's engineer witness, says his business from 1929 to 1933 on the Laramie River lands in Colorado "was to see what land was being irrigated" (R. 191).

Whiting testified that Drummond also made surveys of the irrigated lands under the meadow land ditches in the State of Colorado on the Laramie River and in this he was assisted by Henry G. Watson, Deputy State Engineer, and Earl Lloyd, First Assistant Engineer (R. 216). Whiting did not testify that the irrigated area exceeds 4,250 acres. Neither did Drummond. Meeker made the generalized statement that it exceeds 4,250 acres. On this Wyoming relies and not on the testimony of those who made the surveys for Wyoming. Meeker made no surveys of this

irrigated meadow land in Colorado. His testimony that it exceeds 4,250 acres was first given on rebuttal. He did not say by how many acres.

A very careful survey by Engineer Roderick L. Downing, Associate Professor of Engineering at the University of Colorado at Boulder, showed the actual acreage of irrigated meadow lands (R. 449), is the total of 4,234.5 acres which includes productive meadow, pasture meadow, and irrigated sage brush. This was portrayed on the map, defendant's Exhibit I, and the witness described in a very complete manner the nature of the meadow areas in Colorado on the slopes of mountain valleys of the head waters of the Laramie River.

The decree does not take from the meadow ditches senior to 1909 the appropriations they had been using by the method of constant meadow flooding accepted both in Colorado and Wyoming as good husbandry in raising wild hay in the Laramie watershed.

In arriving at the available supply of the Laramie River as 288,000 acre feet, it was found there had already been a river dimunition by the 4,250 acres of meadows irrigated in Colorado and their use of one acre foot per acre per year or 4,250 acre feet; that the Skyline Ditch use of 18,000 acre feet and the relatively small amount appropriated from Deadman Creek prior to 1902 by the Wilson Supply Ditch had already been taken out, because they were recognized senior appropriators. It was intended to recognize these senior appropriations in both States in determining how much was left for the appropriations of the Greeley-Poudre then being prosecuted, shortly designated in the decree as the Laramie-Poudre tunnel appropriation.

When the Supreme Court apportioned this water of the interstate stream between Wyoming and Colorado, it did not allocate, separately to each senior ditch in Colo-

rado and to each ditch in Wyoming so irrigating the meadows, a fixed amount. The Court allocated the 4,250 acre feet to the Colorado meadow ditches as a group. The 272,500 acre feet apportioned to senior Wyoming ditches was to them as a group. This apportionment to the Wyoming meadows and the Colorado meadows and the other Wyoming ditches was in recognition of their reasonable requirements. The Court said:

> "There are some existing Colorado appropriations having priorities entitling them to precedence over many of the Wyoming appropriations. These recognized Colorado appropriations are, 18,000 acre feet for what is known as the Skyline Ditch, and 4,250 acre feet for the irrigation of that number of acres of native-hay meadows in the Laramie Valley in Colorado, the 4,250 acre feet being what Colorado's chief witness testifies is reasonably required for the purpose, although a larger amount is claimed in the State's answer. These recognized Colorado appropriations, aggregating 22,250 acre feet, are not to be deducted from the 288,000 acre feet, that being the available supply after they are satisfied. Nor is Colorado's appropriation from Sand Creek to be deducted, that creek, as we have shown, not being a tributary of the Laramie." 259 U. S. 419, 490.

As to the needs or measure of the Wyoming senior appropriations, the Court said:

> "The evidence shows that the Wyoming appropriations having priorities senior to the one in Colorado, and which are dependent on the available supply before named, cover 181,500 acres of land, and that the amount of water appropriated and reasonably required for the irrigation of these lands is 272,500 acre feet. A much larger amount is claimed, but our finding restricts the amount to

what the evidence shows is reasonably required, which is 1 acre foot per acre for the larger part of the lands, 2 acre feet per acre for a part, and 2½ acre feet per acre for the remainder.

"As the available supply is 288,000 acre feet, and the amount covered by senior appropriations in Wyoming is 272,500 acre feet, there remains 15,500 acre feet which are subject to this junior appropriation in Colorado. The amount sought to be diverted and taken under it is much larger.

"A decree will accordingly be entered, enjoining the defendants from diverting or taking more than the 15,500 acre feet per year from the Laramie River by means of or through the so-called Laramie-Poudre project." 259 U. S. 419, 495.

The apportionment to the meadow lands in Colorado and to all the lands in Wyoming for senior appropriation was based upon the needs for irrigation of the acreage of the lands found to be irrigated by this group of ditches. The consumptive use was the measure. There were seventy meadow ditches in the mountain areas using from the Laramie in Colorado and as many in Wyoming including the tributaries. The Court did not determine the priority and amount of each of these meadow ditches in either state, but apportioned the amount upon the reasonable requirements of these lands in both states. The Court had before it and, of course, considered, in recognizing these Colorado meadow uses that water must, in growing season for sixty days be kept flowing constantly over the hay meadows and runs quickly back to the stream, due to the gravelly soil within the strips where it is applied, but the amount by which the river is depleted by such use is one acre foot per acre per year, by the then, testimony of the Colorado Engineer, Field, and then and now by Wyoming's expert Meeker. In determining the diminution of the river

at the State line by these Colorado uses one acre foot per acre, or 4,250 acre feet, was arrived at. It was not intended to compel a change in method of irrigation of meadow lands either in Wyoming or in Colorado, nor to deprive those senior meadow appropriations of the water they had been using according to the customary practices of hay culture in these high mountain valleys of the Laramie in Wyoming and in Colorado. Diminution of river supply by their use is what was being determined.

To restrict meadow ditch use to 4,250 acre feet headgate diversion, by the stoppage of this flowing of water across the meadows while the hay is being raised would dry them up and dry up the settlement under these seventy ditches and meadows in Colorado. The roots must be kept wet (R. 476-491, 495, 525, 530).

Because diminution of the river at the State line was the thing being complained against and for which injunction was sought, Wyoming pleaded in its Bill of Complaint in the former suit that more than seventy-five per cent of this water used on the meadow lands in the Laramie Valley in Colorado returns quickly to the stream, and distinguished it from the diversions being threatened by the works of the Greeley-Poudre Irrigation District which it named the West Side Ditch, the East Side Ditch and the tunnel, showing that these new threatened diversions would take the water out of the said watershed and drainage basin of said river, "where the said water cannot return to the said river" (Bill of Complaint in Record there, pages 8 and 9).

Reading the decree in the light of the record and opinion in the prior suit, it is submitted that this deduction of 4,250 acre feet for the meadows in determining the remaining supply, and this recognition of the 4,250 acre feet from the seventy meadow ditches without separate allocation to each, was to permit a diminution of the river to

that amount in irrigation of the meadows by these senior ditches according to the practices of husbandry on such mountain meadows along the river in Colorado as well as on the Laramie in Wyoming, and its tributaries, to-wit, constant flowage across them during the hay growing season to the extent of the consumptive use for 4,250 acres of meadows.

(1) ADMINISTRATION IN MEADOW WATER DISTRICTS IS THE SAME IN COLORADO AS IN WYOMING. MEEKER'S CRITICISM, AS SHOWING INFREQUENT VISITS, INEXACT ANNUAL REPORTS, OF DISTRICT 48 WATER COMMISSIONER IN COLORADO, NO MEASURING DEVICES ON THE MEADOW DITCHES, REPORT BASED ON NO MEASUREMENT DOES NOT SHOW VIOLATION. IN ABSENCE OF VIOLATION OF THE DECREE, WYOMING'S RIGHTS DO NOT NOW, ON THAT ACCOUNT, CALL FOR EQUITY TO INTERPOSE BETWEEN THE STATES.

There was not occasion for frequent visits to the heads of the ditches in Water District 48, on the Laramie River, nor for measurement or record thereof, by its local water commissioner, Mosier. Meeker testified (R. 304) from the District No. 48 Water Commissioner's annual field books:

> "I find, in studying the entries of the Water Commissioner to the various ditches, that they were visited infrequently."

But the evidence showed the Water Commissioner of a like district in Wyoming likewise visited the various ditches infrequently. Wyoming's Widman (R. 141) testified that as water commissioner and as deputy there for twelve years he had made but five visits up Sand Creek. The reason is that in both States there has not been occasion to visit the meadow ditch headgates frequently. The priorities are defined. The consumptive use of water is well known and accepted to be not over one acre foot per acre per year. The water returns from ditch to lower ditch and is used over and over again within these narrow

mountain valleys of the Laramie, in Wyoming as well as in Colorado. Calibrated measuring devices and automatic registering instruments are not employed or occasioned in the areas involved in either state. There is no means for accurately measuring, in acre feet.

At the end of the year the District 48 Water Commissioner made up his field book as an annual report largely from his inquiries of ranchers and of their foreman, as his annual certificates showed. Much was tried to be made of these certificates, but Mr. Meeker and the Wyoming authorities well understood that method of administration obtained in both States.

Meeker also criticises the head works of the meadow ditches in Colorado (Ex. 72, R. 300-301). But his description shows they are no different than those used generally on the only Wyoming mountain meadow area here particularly discussed, the Sand Creek meadow ditches in Wyoming. Stimson described these (R. 789-791) and showed by photographs of them, Exhibits O-2, P-2, Q-2, R-2, S-2, T-2 (R. 1557-1562). That none had weirs, some had makeshift dams, some no headgate structures at all, or any appliances to regulate the water. This was not contradicted. Also, as to the method of administration and of keeping records of the flows in Wyoming in this similar area of meadow ditches, Stimson testified that it was no different than that practiced in the meadows of the Laramie in Colorado. Widman, the Water Commissioner in Wyoming, told him he had absolutely no way of telling the amount of water that had been diverted by these ditches from Sand Creek, that there was no record of diversions of water from Sand Creek. The State Engineer's office in Wyoming could not find for Stimson any record of diversion of water from Sand Creek in Wyoming (R. 791).

The headworks of these ditches are not, it is true, generally equipped with measuring devices. The ditches

are small, the means of the ranchers are likewise. The acreage of meadows irrigated in Colorado has not been increased. The average acreage irrigated by the seventy ditches is only about sixty acres each. The record shows the same condition obtains on the high mountain ranches in Wyoming. There is no occasion for refined measuring. The consumptive use is the important thing. The headgates of these ditches are no differently built or administered than those in Wyoming on the Laramie River meadows above Wheatland Reservoir, on the Little Laramie, and on Sand Creek. Local conditions and necessities in both States recognize this situation and method of husbandry.

The Colorado method on the meadow land ditches is no whit less scientific, less exact, worse or different than in the complainant's own meadow land appropriations. Imposition of costly meters and scientific registering devices would amount to confiscation to the ranchers in those valleys in both States.

As to the trans-mountain diversions, where the water is being taken out of the Laramie drainage basin, there are maintained, with constant caretakers, and vigilant surveillance, improved weirs to gauge and register the amounts of water taken, and the records thereof are kept by the Water Commissioner of District 3, as the Colorado law requires, and these records are available at his office at Fort Collins, at the State Engineer's office, in Denver, at the ditch companies' offices at Fort Collins and at Greeley.

VII.

The Skyline Ditch Appropriation.

The Skyline Ditch was the first trans-mountain diversion from the Laramie River to the Cache la Poudre River. It was constructed in 1891 to 1893 and water has been

diverted each year since the construction for use in irrigation of lands of the stockholders of the Water Supply and Storage Company, a mutual ditch company irrigating about 50,000 acres of land in Larimer and Weld Counties, Colorado. The water for the Skyline Ditch is taken from the West Fork of the Laramie River at an altitude of about 9,500 feet and carried back along the slope of the mountain to the south and emptied into the reservoir known as Chambers Lake. In its course the Skyline Ditch intercepts a number of small streams tributary to the West Fork of the Laramie, and the water so collected in the ditch throughout its length is measured at the lower end just before it enters Chambers Lake.

For many years, at least since 1899, the water diverted through and by means of the Skyline Ditch has been measured, and at the time of the hearing in the former case it was found and determined that the annual diversion had averaged approximately 18,000 acre feet and such was the finding of this Court in the opinion and decree (259 U. S. 419 at 490). The measurements of the water in this ditch were found in Exhibit 124 of the Record in that case. The copy of the Exhibit is found in the defendant's Exhibit L-3 (R. 1617), and are extended from 1913 to 1932, inclusive, by defendant's Exhibit M-3, page 1619 of the Record in this case, and the right of Colorado and the users of water under this appropriation was recognized and approved by this Court in that case to the extent of 18,000 acre feet per annum. This approval and finding was affirmed in the present case on motion to dismiss the opinion, which is found in 286 U. S. 494.

The amended bill in this case complains in the 12th subdivision (R. 37) that the State of Colorado permitted diversion through the Skyline Ditch of amounts of water in excess of 18,000 acre feet in three years, viz.: In 1927, 22,150 acre feet; in 1928, 19,397 acre feet; in 1929, 24,363 acre feet.

The answer of the defendant admits the diversion of the amount of water complained of in 1927 and 1928, but denies that the amount mentioned as having been diverted in 1929, but admits the diversion of 23,686 acre feet (R. 54). The answer then contains an allegation that no more than 37,750 acre feet have been diverted by means of all of the recognized appropriations of the State of Colorado, including the amounts mentioned as having been withheld by means of the Skyline Ditch.

When testimony was taken in this proceeding, the witness, R. I. Meeker, was asked with reference to the diversion through the Skyline Ditch in the year 1926, and the entire argument of complainant (subdivision IV of its brief, page 31), on the subject of the Skyline diversion is with reference to 1926 and an alleged "unreported" diversion through the Skyline Ditch in that year (R. 368) and which he found to be a total of 1,274 acre feet above the 18,000 acre feet allocated to the ditch, although the brief referred to fixes the volume of such unreported water to be 1,633 acre feet. We refer to the statement of Mr. Meeker, as follows: "As previously testified I determined that 19,274 acre feet were diverted by the Skyline Ditch during the year 1926" (R. 368). No other complaint is made for the entire period of 1922 to 1932, inclusive.

The explanation for the so-called "unreported" diversion is found in the testimony of the witness McAnelly, the Water Commissioner, who states (R. 614), "With reference to testimony for plaintiff that during the week of June 19 to 26 an average flow of 99 second feet through the Skyline Ditch was unreported by me as Water Commissioner when the automatic register sheets showed continuous diversion for that week, I will say that, as I recall, the year 1926 was one of a very heavy flow both on the Cache la Poudre side and on the Laramie River, and that the water was coming so fast on the Laramie side it was

impossible to keep it out of the ditch. The Company had endeavored to shut the water off and made no daily report of any diversion and it was not reported until the sheets came in and, in turn, they were sent to the State Engineer."

Mr. Meeker states that the diversion in 1926 was "unreported" and yet he found the record in the office of the State Engineer, the very place such records are supposed to be found. He reached his result by checking the amount shown on the weekly report of the Water Commissioner against the automatic register sheets, with the result that in one year out of eleven, he discovered an alleged error in those reports of 1,274 acre feet.

Some mention is made in the brief (p. 32) that the measuring device is not operated at all times when water is being taken from the Laramie River, and reference is made to the testimony of the witness Drummond, who says (R. 168) "that the only thing I did then (1928) was snowshoe to the Skyline Ditch and see whether they were operating. I found a channel about two feet wide cutting through the middle of the canal, a channel cut through the snow down to the bottom of the ditch. I presume you would call it opening the canal for the spring flow. There was very little water flowing at the time, and, as I observed, there was no record being made of that delivery of water." Only one answer can be made to such an argument, if such it be, and that is, that science has yet been unable to furnish a measuring device which will operate in freezing weather and which will measure water when it is frozen, as is the case in high altitudes in the early spring.

In the case of Wyoming v. Colorado, 259 U. S. 419, this Court found and determined that the Laramie River, with its tributaries, had a dependable flow of 288,000 acre feet per annum; that before making this figure there had been deducted 4,250 acre feet for use on the meadow lands

in Colorado and 18,000 acre feet used through the Skyline Ditch in Colorado; that the prior Wyoming appropriators were entitled to 272,500 acre feet of the total flow of 288,000 acre feet and that the Laramie-Poudre Tunnel works were entitled to not more than 15,500 acre feet, the amount remaining in the river.

The 288,000 acre feet in the river were found by the Court from a long time mean or average covering a period of many years flow, and the 18,000 acre feet to be deducted for use through the Skyline Ditch was arrived at in the same manner, that is, the average flow during a long period of time. The average at the State line on the Big Laramie must have been considered with reference to the deductions of the same years of the diversions by the Colorado ditch. Some years the run-off was heavy, some years it was small, but over the period from 1899 to 1913, inclusive, the flow was equalized and amounted to approximately 288,000 acre feet from all sources for use of the appropriators in Wyoming to the extent of 272,500 acre feet and of the Laramie-Poudre Tunnel works, 15,500 acre feet. To illustrate how nearly that average was to the correct amount, we wish to refer again to the defendant's Exhibit L-3 (R. 1617), which was Exhibit 124 in the former case, and to M-3 (R. 1619), which was Exhibit 124, carried down to and including 1932. From that table it is demonstrated that up to 1913, when the testimony in the former case was taken, the average for the fifteen years when records were available was 18,578 acre feet per annum. The next period, from 1914 to 1932, inclusive, the average diversion was 16,384 acre feet per annum; the annual diversion from 1922, the date of the decree in the former case, to 1932, inclusive, was 17,808 acre feet and the average or mean for the entire thirty-four years from 1899 to 1932 was 17,352 acre feet. This Exhibit also indicates that in the eleven-year period from 1922 to 1932 there were five years in which more than

18,000 acre feet were diverted through the Skyline Ditch, and in six years when the diversion was less than that amount, the low flow being in 1931, 13,659 acre feet, and the high being in 1929, when the diversion was 24,490 acre feet. It is interesting to note that the years of short flow and of excess flow of the Laramie River at the State line follow in approximately the same ratio.

Mr. Meeker's testimony (R. 368) shows the 1926 flow in the Skyline Ditch to have been 19,274 acre feet, while Mr. Tipton's statement (Ex. M-3, R. 1620) shows the diversion to have been 18,747 acre feet, a difference of 527 acre feet or about three per cent. Mr. Patterson, the other Colorado engineer, testified (R. 716) that he found the diversion for the same year to be 18,903 acre feet, a difference of 371 acre feet or about two per cent less than the amount found by Mr. Meeker. The Meeker's figures, as were those of Tipton and Patterson, were arrived at from investigation of the records found in the office of the State Engineer of Colorado. In passing, it may be well to note that the Meeker figures include 490 acre feet which he charged to the Skyline Ditch, and which he admitted (R. 376) were reported as diverted through the tunnel, and, therefore, a duplication. Even if we assume the Meeker figures of 19,274 acre feet for 1926 to be correct, the addition of the excess (527 acre feet more than the Tipton figures or 371 acre feet more than the Patterson figures), yet the average for the eleven-year period is under 18,000 acre feet.

If we must deal with averages in considering the share of the waters of the Laramie River allocated to the Wyoming users, we must do likewise in dealing with the measurements of Colorado's water.

Referring now to the total diversions by Colorado amounting, as this State claims, to 37,750 acre feet annually exclusive of the Sand Creek diversion or to 33,500

acre feet if we exclude both Sand Creek and the meadow lands. The years 1926 and 1929 are apparently the only years in the period from 1922 to 1932, inclusive, when there was a claimed diversion of more than 33,500 acre feet out of the valley of the Laramie River. This appears from Meeker's testimony (R. 376-378). He says: "The correct figure for 1926 is 36,758 acre feet of which 2,234 acre feet was through the Sand Creek System," thereby leaving a total of 34,524 acre feet by means of the two diversions mentioned. From this must also come the 490 acre feet of duplication (R. 376), leaving the grand total of 34,034 acre feet or an excess of 534 acre feet over the amount due Colorado by means of the two diversions and an amount less than two per cent above the total of 33,500 acre feet. This was in a year when there was a 17 per cent excess at the State line (R. 910). It will be noted that for 1926 (R. 371) the Meeker figures are not based on actual records, but are assumed by him, mainly from the erroneous Mosier report, and it has been fully demonstrated elsewhere in this brief, Point V, that the figure therein was due to a mistake and showed more than 5,000 acre feet in excess of the actual diversion through the Laramie-Poudre Tunnel. The only other year mentioned by Mr. Meeker which shows a total diversion in excess of 33,500 acre feet (the aggregate allotted to the Skyline Ditch and the Laramie-Poudre tunnel works) is in 1929. He says that (R. 381) the total of all trans-mountain diversions from the river, excluding the Sand Creek diversion for that year, amount to 35,522 acre feet. In the figure he included Lost Lake, Columbine and Bob Creek ditches. This amounts to an excess diversion in the year 1929 of 2,022 acre feet or approximately six per cent excess above the allocated amount to the two diversions mentioned. This was in a year of excess flow at the State line of approximately 23% (R. 910).

We therefore find that in two years out of eleven under consideration, Colorado has exceeded, as attempted

to be shown by complainant's witness Meeker, the amount awarded to the two diversions mentioned and taken an excess of 2,557 acre feet of the waters claimed by the State of Wyoming, an average over the period of considerable less than 1% per annum, and this figure on the measurements of the complainant's own engineer (R. 382). The figures of the engineer for the defendant show less than that amount.

On the other hand, the testimony of the engineer for the defendant (Tipton's Exhibit J-3, page 1615) shows the total Colorado trans-mountain diversion for the period of 1922 to 1932 (excluding only Sand Creek) to have been an average of 26,878 acre feet per annum or 80% of the total allotted to the two diversions mentioned.

Certainly the appeal of Wyoming for relief from substantial injury, or for protection against threatened invasion of its rights, falls far short of being proven by the "clear and convincing evidence" of either, as is required by this Court in controversies between states.

Some criticism is directed at the Skyline Ditch with regard to its measuring devices and the records kept in connection with its diversions. This is found on page 46 of the brief of complainant, and intimates that Mr. Tipton has arrived at a different result in his study of the 1926 diversions than did Mr. Meeker—a glance will show that the two engineers must have used the same records and in the same manner for the same result is reached, viz.: 1,623 feet variation between the commissioner's report and the automatic charts. Complaint is made that the charts are not complete and are read by inexperienced individuals employed by the diverting company. This statement is not in accordance with the fact. The Water Commissioner, an engineer, reads all charts and corrects his report during the ensuing week and sends the charts to the State En-

gineer, where they are again checked (McAnelly, R. 436). The measuring devices are standard and properly record the diversions (McAnelly, p. 685).

In this connection, it is a significant fact that the measurements and estimates by Meeker, and those of Tipton and Patterson, covering an eleven-year period, should be within 3% of each other. This is well within the reasonable limits of accuracy in the measurement of water—the United States Geological Survey declares that measurements within 5% are excellent (R. 840), and Mr. Meeker acknowledges such to be true.

VIII.

Bob Creek Ditch, Columbine Ditch and the Lost Lake System.

The Bob Creek Ditch diverts its supply of water from Bob Creek or Nunn Creek, and certain unnamed small tributaries of Nunn Creek along the course of the ditch.

The course of the ditch from its source or head is in a general southeasterly and easterly direction, discharging its waters into a tributary of Roaring Fork Creek, known as Tunnel Creek, and which Roaring Fork Creek in turn discharges its water into the main channel of the Cache la Poudre River.

It appears from the statement of claim that work commenced on Bob Creek Ditch by survey on the 24th day of September, 1897 (R. 1479, Testimony of E. J. Gregory, R. 619).

On the 17th day of October, 1898, a survey was commenced for the construction of an extension to the original project, known as Bob Creek Extension Ditch (Deft.'s Ex. Z, R. 1477), which last mentioned ditch discharges its

water into the head of the original Bob Creek Ditch across the channel of Bob Creek. The general course of the extension of Bob Creek Ditch is westerly and southwesterly, and extends from Bob Creek a distance of approximately 6,000 feet, the source of supply of the Extension Ditch being divers and sundry unnamed creeks tributary to Nunn Creek. John McNabb, defendant's witness, testified that the original project was completed in the year 1902, and the Extension in the year 1920. (Testimony John McNabb, Deft.'s witness (deceased), Deft.'s Ex. D-1, R. 1491). The total length of the Bob Creek Ditch, including the Extension, is 14,130 feet. Its maximum capacity is 50 to 60 cubic feet per second of time (R. 616, Deft.'s witness Burgis Coy).

An adjudication proceeding is now pending in the District Court of Larimer County, Colorado, wherein claims have been filed by the owner of Bob Creek and Columbine Ditches, to obtain a dating and adjudication. This adjudication has not proceeded to decree because of the pendency of the instant case (R. 618, testimony of defendant's witness, F. W. Stover).

Columbine Ditch diverts its supply of water from Columbine Creek, which is a tributary of Deadman Creek. Its general course is in a southerly direction and it is about 6,200 feet long, discharging its waters into the North Fork of the Cache la Poudre River. Its maximum capacity is 40 cubic feet per second (R. 616, Deft.'s witness, Burgis Coy). The Columbine Ditch was originally included as a part of the Sand Creek System, and was included within the 288 cubic feet of water per second of time adjudicated to that System, and was given the date of June 15, 1899, by the decree of the District Court of Larimer County (R. 1282).

On the 4th day of October, 1919, Roy A. Portner acquired the ditch by warranty deed from The Divide Ca-

nal & Reservoir Company, its then owner, that company, however, reserving its priority No. 38 for 288 cubic feet decreed to the Sand Creek Ditch system by the District Court of Larimer County, of October 11th, 1906 (R. 1473). Portner conveyed to the present owner, The Mountain & Plains Irrigation Company, on October 27, 1920. The original plan was to divert water from Deadman Creek into Sand Creek, and from Sand Creek by another ditch into Sheep Creek, then through Sheep Creek into the North Fork of the Cache la Poudre River, thence to the main stream of the Cache la Poudre. However, it was found that this project was not feasible. The ditch, as used by The Mountain & Plains Irrigation Company, diverted the water from a tributary of Nunn Creek, Columbine Creek, and drops the water directly into the North Fork of the Cache la Poudre River.

The head of the Bob Creek Ditch is approximately ten miles from the West Portal of the Laramie-Poudre Tunnel and is approximately twelve miles from the head of the Columbine Ditch to the West Portal of the tunnel (see map attached to Complaint).

The source of the water supply is in reality on a different watershed than the West Side Collection Ditch, the East Side Collection Ditch and the Skyline Ditch. The valley of the Laramie River lies between the Skyline Ditch, the West Side Collection Ditch and the Bob Creek and Columbine Ditches.

From the computation prepared by the defendant's witnesses, R. J. Tipton and C. L. Patterson (Ex. H-3, R. 1614) it appears that the following quantities of water were diverted for the years 1922 to 1932, inclusive:

Bob Creek Ditch:

1922	508	acre feet
1923	1095	" "
1924	00	" "
1925	738	" "
1926	00	" "
1927	1028	" "
1928	526	" "
1929	1143	" "
1930	631	" "
1931	633	" "
1932	822	" "

Columbine Ditch:

1922	180	acre feet
1923	329	" "
1924	00	" "
1925	257	" "
1926	00	" "
1927	371	" "
1928	369	" "
1929	585	" "
1930	158	" "
1931	210	" "
1932	174	" "

The mean or average diversion for the period from 1922 to 1932, inclusive, for Bob Creek Ditch was, therefore, 648 acre feet, and for a like period for Columbine Ditch, the average or mean diversion was 239 acre feet, or an average diversion for the two ditches of 887 acre feet per annum.

Having regard to the diversions through the Laramie-Poudre Tunnel and the Skyline Ditch, the diversions of Bob Creek and Columbine Ditches are relatively small and represent a slight average diminution of the waters of the Laramie River. The water produced by these ditches

is early, that is from about the 15th to 20th of May, and until the first of July (R. 608, testimony of defendant's witness, Roy A. Portner).

Colorado does not propose to permit further diversions of water through these ditches, if such diversions are "illegal" as characterized by Wyoming. After the decision of this Court, rendered May 31, 1932 (Wyoming v. Colorado, 286 U. S. 494) the State Engineer of the State of Colorado ordered the diversions through Bob Creek, Bob Creek Extension and Columbine Ditches stopped, and from and after the 17th of June, 1932, no diversions have been made through these ditches (R. 610, testimony of Deft.'s witness, Roy A. Portner).

It has been and is now the contention of Colorado that the relative rights between the citizens of this State in the appropriation and use of the waters of the Laramie River, are to be determined in the Courts and under the laws of the State of Colorado, subject, of course, to any limitation placed thereon by the judgments, opinions and decrees of this Court.

Snowfall in the mountains is temperamental. One year there may be an abundance of snow in the mountains to the west of the Laramie River, which will supply the West Side Collection Ditch and the Skyline Ditch, and little or no supply for Bob Creek, Columbine and Wilson Supply Ditches. Conversely, there may be an abundance of water supply above the creeks supplying Bob Creek, Columbine and Wilson Supply Ditches, and very little moisture to supply the Skyline and West Side Collection Ditches. In such a year neither the Laramie-Poudre nor the Skyline Ditch would obtain the 15,500 acre feet and the 18,000 acre feet allotted to them respectively, but the diversions for the benefit of the Poudre Valley could in such year nevertheless be increased somewhat by the use of the Bob Creek and Columbine Ditches.

If the aggregate amount available for the use of Colorado, 37,750 acre feet, is not exceeded by the use of any "works" constructed or under construction at the time of the hearing of the former case in this Court in 1914, it is respectfully submitted that Wyoming should not be heard to complain.

Again, let us assume that in a given year, the embankments of the West Side Collection Ditch break, and it is therefore unable to carry its allotted 15,500 acre feet, would it not be unfair to the users of water in Colorado to deprive them of the use of this water or some portion of it, if a like amount could be diverted through the Bob Creek or Columbine Ditches?

We submit that the water users of Colorado should not be made dependent entirely on the vagaries of nature. It is not at all unlikely that a cave-in will occur in the Laramie-Poudre Tunnel, and the 15,500 acre feet available to it could not be carried to the Cache la Poudre River. Similarly, under these circumstances, it would be inequitable to deny to the water users of the Poudre Valley such water as might be obtained through the existing works of the Columbine and Bob Creek Ditches.

Sometimes, for one reason or another, appropriations of water are abandoned. It seems to us that this Court did not intend to hold that in the event of the abandonment of all or any part of the 37,750 acre feet allotted to Colorado (as we see it) by the decree and opinion of this Court in 1922, that thereby all of the waters of the Laramie River would become available to the water users of Wyoming.

It is said of these diversions by Wyoming (p. 35, brief):

> "These diversions are illegal and in violation of the decree in the former suit, and are against the equitable rights of the State of Wyoming to appro-

> priate and use the water remaining after the recognized Colorado appropriations are satisfied,"

citing the opinion of this Court in Wyoming v. Colorado, 286 U. S. 501, 76 L. Ed. 1248.

Properly construed, we believe that the State of Colorado and the citizens within this State are limited in the "quantity of water" to be diverted within this State from the Laramie River. We do not believe this Court intended to determine the relative rights of Colorado appropriators in the waters of the Laramie River as between themselves.

At page 626 of the opinion in the above case, this Court said:

> "Construing the decree in the light of the record and opinion to which counsel for both States appeal, we think it is intended to and did define and limit the quantity of water which Colorado and her appropriators may divert from the interstate stream and its tributaries, and thus withhold from Wyoming and her appropriators."

The decree was intended to find and adjudicate the relative rights of the two States and the citizens of the two States as a class; that is to say, the determination by this Court that there was 18,000 acre feet, for example, available to the Water Supply & Storage Company for diversion into its Skyline Ditch, would not bar another appropriator in Colorado from showing in the Courts of Colorado that in fact a portion of the 18,000 acre feet allotted to the Water Supply & Storage Company was his by virtue of an earlier appropriation, or because of an abandonment by the Water Supply & Storage Company of a portion of its appropriation.

Wyoming takes a position in this connection which appears to us to be not only inequitable but untenable. If it is held that Wyoming's construction of the language

of the Court is the correct one, the result would be that no appropriator in Colorado junior to the appropriators named in the decree of this Court in 1922 (Wyoming v. Colorado, 259 U. S. 419) could ever acquire any rights to the use of water of the Laramie River, superior to appropriators of Wyoming, even though the appropriators in Wyoming might be many years junior to the Colorado junior appropriator. Such a construction would result in the Colorado junior appropriator being barred from the use of his appropriation without ever having had his "day in Court."

In Colorado and in Wyoming, under the doctrine of appropriation, the owner of a water right does not acquire an absolute title in the water. His property right is only insured by its use. It may be lost by non-use, and in such case, it is the law of both States that a junior appropriator applying such abandoned water to a beneficial use acquires the prior right to its use. If Wyoming's construction of the Court's decree is sustained, this doctrine of the law of appropriation in both of the litigant States will be entirely ignored. We do not believe that the asserted construction of Wyoming can be sustained under the decisions of this Court. Kentucky v. Indiana, 281 U. S. 163; 74 L. Ed. 797; Connecticut v. Massachusetts, 282 U. S. 660; 75 L. Ed. 602.

Referring to the Lost Lake System, the testimony introduced in the former case shows that this system was used and in operation at the time of taking the testimony in the first Wyoming-Colorado suit (R. 700, testimony of Deft.'s witness, John Armstrong, in former case).

While no mention was made of these small lakes in the opinion of the Court in Wyoming v. Colorado, 259 U. S. 468, the amount of water which had theretofore been stored, and used by means of this system must have been taken into consideration by the Court as one of the prior

Colorado appropriations, for the reason that the flow of the Laramie River, estimated at the State line to have been 288,000 acre feet was, after all of the prior appropriations had been taken by the Colorado users. It would seem, therefore, that the deduction of the small amount theretofore stored in the Lost Lake System never had reached the State line and the subsequent use by the appropriator did not constitute any additional drain on the river. It is true that no decreed priority has ever been granted by Colorado on these lakes. Defendant's witnesses, Rowe, Kluver and Edwards testified as to the construction and use since about 1891 (R. 598, 602, 622).

All that has been said with respect to the use by Colorado appropriators of the Columbine and Bob Creek Ditches, as a matter of construction of the decree of this Court, is also applicable with respect to the Lost Lake System. Even though it is not specifically referred to in the decrees or opinions of this Court, it appears from the evidence that it was constructed and operated as a part of the system of the Water Supply & Storage Company.

The position of Colorado is that she feels that in the years when the appropriations of the Laramie-Poudre Tunnel, the Skyline Ditch and the Meadows do not exceed the amount found to be available to Colorado, to-wit, 37,750 acre feet, that in such years, she should be permitted to make use of the available works to bring up her quota to the allotted amount, if the water is available and can be diverted through such works.

IX.

The Wilson Supply Ditch.

At pages 36 to 41 of the brief of complainant, there is set forth so much of the modified decree of October 9, 1922, as pertains to said ditch, and they say that its rights hinge upon whether there was an existing appropriation of water of Deadman Creek prior to 1902, and if so, what amount? They next attack the appropriation both under the modified decree of this Court, and under the laws of Colorado, and contend that said ditch has no appropriation, and has no right to take or divert any water in any date or amount. In view of these contentions we will discuss the same under several heads.

(1) HISTORY OF THE WILSON SUPPLY DITCH SYSTEM, AND ITS APPROPRIATIONS OF WATER.

The title to this system of ditches, also known as the Sand Creek Ditch System, has passed through several ownerships, and interests therein, until it was finally merged in the present owner, The Divide Canal and Reservoir Company, after the same was completed and been in use for several years, where it has since remained. A brief statement of the history from the filing of the first maps and ditch statements claiming appropriations therefor, and descriptions of the respective ownerships are as follows:

Under date of July 21, 1897, Phillip Wilson, and his engineer, Rollin Q. Tenney, filed a statement of claim with map attached, pursuant to the statutes of the State of Colorado, for the Wilson Supply Ditch, particularly describing the same, and stating therein that its carrying capacity from Deadman Creek, to the point of diversion from Sand Creek in Colorado, a distance of 13,145 feet, and that the capacity thereof was 117.5 second feet. That from Sand Creek to Sheep Creek, a distance of a mile

and a half over the Divide to Sheep Creek, its capacity was 288 second feet. Said statement also gave the dimensions and grade of said ditch. This map and statement was introduced in evidence by complainant, marked Exhibit 5 (R. 983-985).

On December 15, 1898, said Rollin Q. Tenney filed an additional map and statement for an extension of said Wilson Supply Ditch south or above Deadman Creek, through Sections 22 and 23, to a point near the south line of Section 26, Township 10 north, Range 75 west. This ditch was 4 feet wide on the bottom and 7 feet wide at high water line, depth of water 2 feet, capacity 35 second feet, date of commencement of work, September 17, 1898. In this filing said Extension Ditch was called The Columbine Extension Ditch (R. 1508).

This ditch so surveyed and appropriation claimed thereby, is the same ditch described in the complaint herein (R. 14), and therein called "The Deadman Extension Ditch," a name never theretofore given to it, but it is the same ditch, and it is a part of The Wilson Supply Ditch, as originally constructed, as testified to by Bruce G. Eaton, who constructed it (R. 658, 661, 662).

After these filings were made by Wilson and Tenney, they proceeded to do work in clearing the timber along the line of said ditches, and they entered into negotiations with Governor Benjamin H. Eaton, who for years had been extensively engaged in the construction of irrigation ditches and reservoirs, to acquire an interest therein, and construct this ditch system. Pursuant to said negotiations, on September 5, 1898, they entered into an agreement whereby Philip Wilson sold his two-thirds interest therein to Governor Eaton, which agreement is Exhibit N-1 (R. 1509).

In order to properly handle the several interests in this project, Benjamin H. Eaton, Bruce G. Eaton, and

Rollin Q. Tenney, incorporated The Divide Ditch Company, Exhibit O (R. 1442-1444). On November 30, 1901, Phillip Wilson, pursuant to his agreement, to sell his interests in said ditch, as above stated, conveyed the same to The Divide Ditch Company, Exhibit P-1 (R. 1511). On December 2, 1901, said Rollin Q. Tenney conveyed to said company his interest in said ditch system, Exhibit Q-1 (R. 1513). On May 1, 1902, Rollin Q. Tenney conveyed his interest in said Columbine Extension Ditch to Benjamin H. Eaton by Exhibit R-1 (R. 1515). And by deed of May 1, 1902, said Benjamin H. Eaton conveyed his interest in said ditches to said company, defendant's Exhibit S-1 (R. 1517).

By the foregoing filings and conveyances the title to The Wilson Supply Ditch and The Columbine Extension Ditch, the same being an extension of The Wilson Supply Ditch, were all merged in The Divide Ditch Company. In the meantime said parties had made filing with the government to procure rights of way over the public domain, Exhibit O-1 (R. 1510-A), which map was filed on November 6, 1899.

Pursuant to said filing of maps and statements for claims of water, and said deeds and conveyances above stated, a large amount of work had been done in clearing the right of way through a heavy timbered country, preparatory to the excavation work of constructing said ditch system. Said work of clearing the timber was a very substantial part of the work of constructing a ditch through a mountainous timbered country. Bruce G. Eaton stated that it was about half of the total work of constructing the ditch, and his testimony shows that the timber had been cleared along that part of the ditch from Sheep Creek to Sand Creek, and from Sand Creek to Deadman Creek, and for a distance of about two miles above Dead-

man Creek, which would be to about the center of Section 26, T. 10 N., R. 75 (R. 649).

It appears from the testimony of Bruce G. Eaton, who was then President of The Divide Ditch Company, and was also the Superintendent of the company, that in April, 1901, after the right of way had been cleared of timber, they moved their ditch outfit, consisting of horses, plows, scrapers, and other tools and utensils from Eaton, Colorad to the north end of said ditch system, and established a camp on the Divide, between Sand Creek and Sheep Creek, and constructed that portion of the ditch, sometimes called the Divide Ditch, of the dimensions and capacities stated in the original filing. It was an open winter in 1901-1902, and they were able to continue their work, particularly the rock work in the tunnel and other portions of the ditch, and they completed that section of the ditch, and thereby diverted water from Sand Creek to Sheep Creek, on May 9, 1902; that his foreman, William Pixler, now dead, was in charge of the work, but he, himself, was frequently present while the work was in progress.

That they then moved the outfit up to Deadman Camp near the Deadman Ditch and constructed that ditch from the upper reaches of Sand Creek, of the size, dimensions and capacity mentioned in the statements of claim and that summer, were enabled to collect and divert water from Deadman Creek for their ditch system. He also stated that they constructed a portion of the ditch above Deadman Creek, of the size and dimensions stated in the statement of claim of the Columbine Extension Ditch, the same being a part of the Wilson Supply Ditch, and worked until driven out by the fall snows. They returned in the Spring of 1903, and completed said ditch to a point where it crossed two unnamed creeks, tributaries to Deadman Creek, and through and across Sections 22 and 23, T. 10 N., R. 75 (R. 635-665).

Said witness, Bruce G. Eaton, testified that, after the timber had been removed, all of said line of ditch as now existing was constructed, as one continuous line of ditch, and without cessation of labor, except during the winter when work could not be done; and that said ditch was constructed at an elevation of 10,500 feet; and that the total cost thereof, not including the use of their equipment, was $150,000.00 (R. 649).

It further appears from the evidence of Bruce G. Eaton that prior to 1904, himself and his father had constructed three reservoirs, filled through the Poudre Valley Ditch, in Water District No. 3, known as Reservoir No. 8, its annex, and Elder Reservoir, with a capacity of about 700,000,000 cubic feet, and had acquired appropriations of water therefor, from the Cache la Poudre River. That they also intended to use part of the capacity of said reservoirs, when available, for the storage of water from the Wilson Supply Ditch, or the Sand Creek Ditch System, by diverting the water into the Cache la Poudre River, and re-diverting it to fill said reservoirs. That they desired to operate said reservoir in conjunction with said Wilson Supply Ditch, and to that end they incorporated, the Divide Canal and Reservoir Company, and conveyed all of said property to said company.

The articles of incorporation stated that it was the intent and purpose of said new company to acquire all of said reservoir and ditch system and to operate the same which purpose is particularly described in said articles, Exhibit P (R. 1446-1454). The deed from the Divide Ditch Company, dated February 15, 1924, conveyed all its interest in said mountain system of ditches to the Divide Canal and Reservoir Company, and ever since has been the owner thereof (Exhibit U-1, R. 1521-1523). Said deed describes the entire line of the Wilson Supply ditch, from section 26, T. 10, N. R. 75, to its point of discharge in Sheep Creek.

After the present company had acquired the property of the Divide Ditch Company in 1904, it employed C. R. Hedke, an engineer, to make a survey of the entire Wilson Supply ditch, and its various portions, from its initial point in section 26, T. 10, N. R. 75, to its point of discharge into Sheep Creek. This he did, and made a map thereof, for its entire length. Said map shows the courses and distances of the entire ditch, including the portion of Sand Creek used as a ditch for the carriage of the water discharged therein. The defendant offered this map in evidence, and the witness carefully examined the same, and stated that it correctly shows the ditch as originally constructed, and since maintained and operated. This map was marked Exhibit J-1 and is shown in R. 1496-B.

The first witness who testified on behalf of complainant was Burton P. Fleming. He testified that he spent the entire year of 1902 and part of 1903 as an engineer employed by the government, to make a careful investigation of Sand Creek and vicinity, under the direction of the Wyoming experiment station, and that on the conclusion of his labors, he made a written report, with a map attached, which was published in Bulletin No. 132 of the experiment station, and that the matters therein stated were correct. Complainant offered in evidence, as its Exhibit No. 1, pages 101 to 123, inclusive, including a map attached at page 101, of said Bulletin of 1903, published by the United States Department of Agriculture, and Fleming testified that he wrote said report, prepared said map, and that the same accurately stated his observations and measurements in 1902 and 1903 (R. 87-89). Said map is also shown as a part of said Exhibit (R. 957). An inspection of this map shows the entire line of this ditch, including the portion thereof in sections 22 and 23, T. 10, N. R. 75. This part of the ditch bears the legend "The Columbine Ditch," but is the same ditch hereinbefore described as "Columbine Extension Ditch," as he found the same in 1902 and 1903.

Witness for defendant, Bruce G. Eaton, while testifying, examined complainant's Exhibit No. 1, and particularly the map shown at page 101, and stated that said Exhibit shows the line of ditch filed on as "Columbine Extension Ditch" connected with the "Deadman Ditch" which was originally built as a part of their Sand Creek system of ditches, theretofore testified to by him (R. 647), and as shown on Exhibit J-1 (R. 957). From these maps it appears that the portion of the Wilson Supply ditch, above or south of Deadman Creek, was an existing ditch in 1902 and 1903 and was so observed by the witness Fleming, and the witness Eaton stated that it was all built as one continuous line of ditch, and as a part of the Wilson Supply ditch and is not a recent structure, as alleged in the bill of complaint herein.

(2) THE ADJUDICATION OF APPROPRIATION OF THE WILSON SUPPLY DITCH, ALSO KNOWN AS THE SAND CREEK DITCH SYSTEM.

On February 3, 1906, a petition was filed in the district court in Larimer County for the purpose of adjudicating and determining the rights to the use of water in Water District No. 48 in the State of Colorado. The Divide Canal and Reservoir Company, then owner of the Wilson Supply Ditch and its various sections, also known as the Sand Creek Ditch System, appeared therein, and filed its statement of claim, of appropriation of water from Deadman Creek and its tributaries, and also from Sand Creek, which statement of claim is defendant's Exhibit K-1 (R. 1497), and it also filed an amended statement showing the line of Sand Creek, to be used as a conduit for the carriage of water, defendant's Exhibit L-1 (R. 502-508). The map, Exhibit J-1, was also made a part of the statement of claim, and the original head of the Deadman Ditch is therein described as being located at a point north 22 degrees, 10 minutes west 950 feet from the south quarter corner of section 26, T. 10, N. R. 75, and states

that the combined ditch runs on the original line of the Deadman Ditch and describes the whole course as one line of ditch to the junction with Sand Creek. It also particularly describes the dimensions and carrying capacity of each portion of the entire ditch system, and showed the same capacities, and claimed the same volume and date of appropriation, as finally determined by the Court, in its findings and decree. The owner of the ditch also submitted evidence in support of its claim of appropriation from the several streams, and on October 11, 1906, the Court made and entered its findings and decrees relative to the various claimants, and their appropriation of water, all in accordance with the statutes of the State of Colorado, relative to the adjudication of water rights in said state.

Compiled Laws Colorado 1921, Secs. 1752-1755 and 1760-1789.

This adjudication decree was marked Exhibit G, and is found in the printed record, pages 1275 to 1296. On page 1278 the Sand Creek System Ditch, being the same as the Wilson Supply Ditch, was given number 36, with date of appropriation of June 15, 1899, and priority number in said Water District No. 38. On page 1278 the decree expressly states that said appropriations of water therein contained

> "shall be taken, deemed and held as intended to determine and establish the several priorities of right by appropriation of water from the streams of said Water District No. 48, for irrigation, of the several ditches and canals * * * each according to the construction, enlargement or extension thereof, with the amount of water held to have been appropriated thereby * * * and the several appropriations of water by means of them respectively claimed in this matter, ordered, adjudged and decreed, as in and by the findings of the

referee as follows:" [naming and describing each ditch in order of its priority and appropriation].

The findings concerning Ditch No. 36, Sand Creek Ditch System, are set forth on pages 1266 and 1267, and show that the capacity of the Columbine Ditch is 40 cubic feet per second of time, and the Deadman Ditch 117 second feet, and said amounts plus the waters appropriated from Sand Creek aggregate 288 second feet. It also states that the Deadman Ditch cuts the main branch of Deadman Creek and two other branches of said creek. The decretal order concerning said ditch is shown on Record pages 1282 and 1283, and it approves and confirms the findings and appropriations made for said ditch in the total amount of 288 second feet, and concludes, "*the appropriation of which water took effect on, and said priority dates from the 15th day of June, 1899.*" The findings and the decretal order for the Sand Creek Ditch system (Wilson Supply Ditch) were also read into the record from said Exhibit G, as aforesaid, and the same are found at page 663-665 of the oral evidence.

The Colorado Supreme Court has repeatedly held that the adjudication decrees of water rights under the statutes of Colorado, as aforesaid, are a complete and final determination, both of the date or priority of the right, and of the volume or capacity stated in the decree, and that said decrees are an acknowledgment of the right to use of water in said state.

Louden Canal Company v. Handy Ditch Company, 22 Colo. 102, 110-114; 43 Pac. 535.

Arnold v. Roup, 61 Colo. 316, 322-326; 157 Pac. 206.

The right of the Divide Canal and Reservoir Company, present owner of the Wilson Supply Ditch, to take and divert water from Deadman Creek and its tributaries, in the amount of 117 second feet, and from Sand Creek,

in the amount of 131 second feet, and 40 second feet from Columbine Creek, aggregating 288 second feet, was fully determined, both as to priority of time, and volume, in said adjudication proceedings. Said decree is the final determination of said right and constitutes a full recognition of said appropriation, by the State of Colorado both as to the date or priority, and also the capacity of said ditch and the volume of said appropriation, and is the right definitely recognized in the modified decree of this Court, made on October 9, 1922, in the former case, between the State of Colorado and the State of Wyoming, and constitutes the only right mentioned therein.

State of Wyoming v. State of Colorado, 260 U. S. 1-2; 66 Law. Ed. 1026.

(3) THERE HAS BEEN NO ENLARGEMENT OF WILSON SUPPLY DITCH SINCE FIRST CONSTRUCTED.

The bill of complaint charges that the Wilson Supply Ditch was enlarged in 1929 and 1930 (R. 14 and 15). And the answer admits that some work of cleaning and repairing had been done at the point indicated, but denies that said work of cleaning was an enlargement, or that the carrying capacity thereof was increased thereby; and avers that such cleaning and repair is necessary almost yearly on a mountain ditch; that the point indicated was in the central portion of the ditch above Deadman Creek, and that, as so cleaned and repaired, it carried no more water than formerly (R. 17).

In support of complainant's contention of enlargement, it offered in evidence a certified copy of the Wilson Supply Ditch map and statement, filed by Phillip Wilson and his engineer, July 23, 1897 (R. 984-A). This map shows a sharp "V-angle" in the course of the survey of the ditch in SE. SW. of section 15, T. 10, N. R. 75. This sharp angle in the line of the ditch as surveyed was occasioned by reason of a sharp point of land on the upper side there-

of. The angle as shown on the map is about 1,000 feet on each side, as it departed from the straight line of the ditch, and as it returned to said straight line, and the distance through this spur was about 400 feet, so that the cut through the point for such short distance made a much shorter ditch, and a straighter line, and involved much less labor. The evidence shows that the original ditch was cut through the spur, and that no ditch was built around it. From the evidence of Bruce G. Eaton, it appears that he arrived one morning when the ditch was being constructed at that point, and he saw that his foreman, William Pixler, had commenced to plow for the ditch on one side of said triangle, following the original survey, for a short distance; that he stated to Mr. Eaton that it was not the proper way to construct the line of ditch at that point; that it was some 2,000 feet or more to follow the survey around said "V-shaped" angle, as shown on Exhibit No. 5, but that the ditch should be cut through the spur, a distance of 300 or 400 feet, and that it would make a straighter and better ditch. Mr. Eaton told him to cut the ditch through the spur, and not go around the high point of land, and that Pixler did cut through said point of land, and so constructed the ditch when it was originally made, and it has so remained until this day. That the cut at the deepest point was about 15 to 18 feet, and that they covered the ditch in this cut with poles to keep the snow from drifting in the winter and filling the ditch (R. 650, 651).

The attention of said witness was called to the testimony of Mr. Drummond and Henry C. Watson, witnesses for complainant, who testified the ditch had been enlarged at said triangle, since the original construction, at that point, and they submitted a photograph, Exhibit No. 11 (R. 988-A), labelled "old ditch," and contended that there had been an enlargement at that point. They also testified that the "old ditch," so called, was not more than a

tenth of the size of the present ditch (R. 187). After having examined said Exhibit, witness Eaton said that the ditch had never been constructed around said spur nor along the line of said "V-triangle," but was originally constructed as a cut through the base of said triangle, at the time when the ditch was originally made (R. 650-651).

Defendant, in its testimony, offered in evidence Exhibit J-1 (R. 1496-B), as surveyed by C. R. Hedke in 1904 after the ditch was completed and in use. This Exhibit consists of a map of the entire system, and shows that the ditch was constructed through the SE. SW. Section 15, T. 10, N. R. 75, on practically a direct line through said spur of the mountain, and not with a V-shaped angle as shown in the original survey. Furthermore, the statement of claim filed in the adjudication proceedings in the spring of 1906, shows by courses and distances that said ditch was built on a comparatively straight line at said point in Section 15, and not with a V-shaped angle, shown on original survey. Further it appears from the testimony of defendant's witness, L. L. Stimson, that in 1933, after he had read the evidence of the complainant's witnesses, and had examined Exhibit 11, he went over the ground at said point, and had examined the claimed ditch shown by Exhibit 11, and stated that its entire length was about 500 feet, and consisted of one plowing that had been taken out and put on the bank; that the total distance around the point or triangle was about 2,000 feet, and there was no evidence of a ditch for the balance of the distance around the triangle, except clearing of the timber, so it is clear that if complainant's witnesses had examined the entire ground around the triangle, instead of the little point where it left the direct line of the ditch, they would have discovered that no ditch had ever been constructed around the two sides of said triangle. Said witness further stated that cutting the ditch through the spur was proper construction, and that anyone would have

been crazy to build a long ditch around said triangle, when they could cut it through the hill for a distance of 400 feet (R. 795).

On cross-examination said Henry G. Watson, witness for complainant, concerning said alleged "old ditch," admitted that he did not know when the cut was made, but thought it was more than 20 years before; that the change of the line of the ditch from the triangle form to the cut would not affect its capacity, and finally admitted that he did not know that the alleged "old ditch" was actually put into service, or whether they changed their plans while they were constructing it; also that it was customary in the construction of a ditch, to change the line at some points (R. 197). From the foregoing it is manifest that the ditch was originally constructed as it now is through said high point or spur, and that there has been no enlargement thereof at that point.

The other point of claimed enlargement was on that part of the ditch south and above Deadman Creek, in Section 22, where some stakes had been set, which he first observed in 1929 (R. 185). This witness examined complainant's Exhibit No. 1 and map attached (R. 957), and stated that the line of ditch from Section 15 to 26, shown on said map, labelled "Columbine," was the line of ditch he called Deadman Extension, and was an extension of the Wilson Supply Ditch, south of Deadman Creek. That he found a ditch constructed along said line, of the size and dimensions in the original statement of claim, and that it was at a point along this part of the ditch where he found the stakes set, for a proposed enlargement (R. 193-195). Said witness also testified that there was wash from the upper side of the ditch which would cause some sloughing into the ditch at times; that in order to keep the ditch in shape and in alignment, it was ordinary practice to clean it from time to time; that if it was not cleaned for three or four years, any ditch would require a more ex-

tensive and thorough cleaning, and whatever washed into the ditch tended to diminish capacity, and require cleaning and repair; that in making such cleaning of accumulations in the ditch, it is ordinarily put in the lower side. That is the ordinary mode of doing such work (R. 195, 196). Neither the testimony of Mr. Watson nor Mr. Drummond concerning this so-called enlargement shows any specific point of enlargement, or the extent of any claimed enlargement, but rather shows the ordinary cleaning and repair of a ditch, which they admit has to be done frequently.

E. B. House, engineer, witness for defendant, testified that he was the engineer who made survey and set stakes for making repair work on the ditch. He stated that the ditch was four feet wide on the bottom with carrying depth three feet at that point. That by reason of being so narrow and deep, there was considerable trouble with the banks breaking, and the storms would wash material from above into the ditch. That in order to correct conditions at that point, he made the ditch wider on the bottom, but more shallow, and changed the cross-section, for a short distance, from four feet wide and three feet deep to six feet wide and two feet deep, which would give the ditch at that point exactly the same cross-section, and was not an enlargement, but was made for the purpose of widening and strengthening the lower bank (R. 762-763). As this change in cross-section was only for a short distance, and made for the purpose of strengthening the banks, it did not change the capacity at this point, from that above or below, and would not constitute an enlargement of the ditch, but only a proper and necessary repair to protect the bank at said point.

Defendant's witness, Bruce G. Eaton, testified that there had been no enlargement of the Deadman Ditch since it was originally constructed, nor of the Deadman Feeder Ditch (R. 660 and 674). And his son, Rex C. Eaton, who

has been superintendent of the ditch for the past 12 years, stated that there had been no enlargement of the Deadman Ditch, nor of the Extension Ditch, since he had been manager thereof, nor since he first worked on the ditch in the summer of 1911. That all the work done thereon at any time was the work of cleaning, incident to the operation of any ditch (R. 667 and 674).

Taking into consideration all of the evidence, it is clear that there has been no enlargement of any portion of said ditch since the time of its construction. That the only work done thereon, was the ordinary cleaning which all the engineers, witnesses for complainant and defendant, said was necessary and proper to be done on any ditch, and especially upon a mountain ditch, which is more difficult to keep clean and in proper repair, than a ditch on the plains. We submit that the complainant failed to establish its contention that this ditch had been enlarged, or its capacity increased, since its original construction.

(4) THE RIGHTS AND APPROPRIATIONS OF THE WILSON SUPPLY DITCH WERE DETERMINED BY THIS COURT IN THE MODIFIED DECREE OF OCTOBER 9, 1922, IN THE FORMER SUIT.

Complainant in its bill of complaint set forth the provisions of the modified decree of this Court, made and entered October 9, 1922 (Wyoming v. Colorado, 260 U. S. 1; 66 Law. Ed. 1026), as a basis of its action in the present case (R. 4, 5), in which the Wilson Supply Ditch was awarded an appropriation of water from Deadman Creek as in said decree stated. After having so pleaded its rights established by said decree, said bill of complaint, par. 14, pp. 15, 16, charges, that nevertheless no appropriation of water whatsoever was so awarded; that there was no appropriation for said ditch prior to 1902, and that there is not now any lawful appropriation of water from said Deadman Creek by or through the Wilson Supply Ditch. In this proceeding complainant contests the rights

awarded said ditch under said modified decree, although they are stated in said decree.

In his brief filed herein, counsel for complainant cites and relies on a portion of the opinion of this Court on motion to dismiss (286 U. S. 494, 496, 497; 76 Law. Ed. 1245, 1251):

> "We are of the opinion that the record, opinion and decree in the former suit, herein reviewed at length, shows very plainly that the decree must be taken as determining the relative rights of the two states, including their respective citizens, to divert and use the waters of the Laramie and its tributaries. These rights were put in issue by the pleadings, displayed in the evidence, and considered and resolved in the opinion. Not only so, but the question of priority in time and right as between the appropriators in Colorado and those in Wyoming were directly presented by the pleadings and evidence and distinctly dealt with and resolved in the opinion."

Concerning which statement counsel says: "thereby settling the question of the construction of the decree in the former case, leaving for determination the question, 'Has the State of Colorado violated the decree?' "

Following this statement of the Court as to what was found and determined in said modified decree of October 9, 1922, counsel for complainant refers to page 35 of the Record, where they have set forth in full said decree showing *inter alia* that the Wilson Supply Ditch was one of the ditches awarded an appropriation by said decree; but this is followed by a statement on page 4 of their brief, and particularly in sub-paragraph (4) thereof, by a statement "that prior to 1902, no water had been appropriated from the headwaters of Deadman Creek through the Wilson Supply Ditch," and other allegations, that the Wilson

Supply Ditch never had an appropriation from Deadman Creek or its tributaries. Again, at page 9 of their brief, they state that one of the issues of fact is whether the State of Colorado is entitled to appropriate any water from the headwaters of the Deadman Creek. Again, on page 10 of their brief, it charges that the facts as established show that the Deadman diversion is illegal; that no water had been appropriated prior to 1902, and none can be lawfully diverted subsequently under the terms of the modified decree. Again, on page 36, in paragraph VI of their brief, they quote that portion of the modified decree pertaining to the Wilson Supply Ditch, and state that the right of Colorado to divert water from Deadman Creek, as provided in said decree, hinges upon whether there was an existing appropriation of water from the headwaters of Deadman Creek, prior to 1902, and in the succeeding pages of their brief, 37-41, they contend that the Wilson Supply Ditch, acquired no decreed right under said modified decree of this Court; and never acquired any valid appropriation under the laws of Colorado.

From the foregoing it is apparent that complainant now contends that this Court erred in granting any existing appropriation to the Wilson Supply Ditch, in said modified decree; that said ditch never made nor perfected an appropriation as therein stated, and no water was awarded thereby, and that all diversions of water from Deadman Creek made by said Wilson Supply Ditch have been unlawful, and to the detriment of the water users of Wyoming, and that said ditch should be now denied the right to divert any water from Deadman Creek. The contentions so made are a direct attack upon said modified decree, and cannot properly be considered in this bill, to enforce the provisions of said decree concerning said ditch.

In the modified decree entered October 9, 1922, in the former suit between Wyoming and Colorado, the right of

the Wilson Supply Ditch to take water from the Deadman Creek, was determined as follows:

> "nor prejudice the right of the State of Colorado, or of anyone recognized by her as duly entitled thereto, to continue to exercise the right now existing and hereby recognized to divert and take from the headwaters of Deadman Creek, a Colorado tributary of the Laramie River, the relatively small amount of water appropriated therefrom prior to the year 1902 by and through what is designated in the evidence as the Wilson Supply Ditch."
>
> Wyoming v. Colorado, 260 U. S. 1 and 2; 66 Law. Ed. 1026.

By the foregoing decretal order this Court clearly determined that the Wilson Supply Ditch then had an existing right and priority to take and divert water from the headwaters of Deadman Creek; that it was an existing right; and was a right recognized by this Court; and that it was an existing appropriation recognized by Colorado; and vested prior to the year 1902. The only undetermined matter was "the relatively small amount of water appropriated prior to 1902." The Court did not undertake to determine the amount, but by referring to the preceding language of the order, it clearly refers to the appropriation in time or amount theretofore recognized by the State of Colorado, as that would be the only way to determine the amount of the water appropriated by said ditch.

As we have before shown, the State of Colorado by its laws and said adjudication proceedings established the amount of the appropriation as 117 second feet from Deadman Creek as of date July 15, 1899, and for more than 20 years prior to entry of said modified decree, it had diverted and taken and beneficially used the amount of said appropriation up to the available water supply therefor,

and so continued to divert and use said water, until this Court more particularly defined the volume of said water, in the former hearing of this cause. (286 U. S. 491, 506; 76 Law. Ed. 1245, 1251.)

If there was any uncertainty concerning the appropriation of the Wilson Supply Ditch, or its right to appropriate water from Deadman Creek, or the amount thereof, the same was settled by the opinion of this Court rendered upon the motion to dismiss (286 U. S. 494-510; 76 Law. Ed. 245-253). In that opinion the Court reviews the former case, and the decree entered therein, and particularly refers to and considers the appropriation of the Wilson Supply Ditch, and specifically stated that it was excepted from the quantity of water allotted to Wyoming, the same as the Skyline Ditch, and in regard to the quantity of water appropriated from Deadman Creek, the Court said:

> "Colorado's state engineer gave 4,250 acre feet per annum as the measure of the meadow land appropriation, 18,000 acre feet per annum as the measure of the Skyline appropriation, and 2,000 acre feet per annum as the measure of the Wilson Supply Ditch appropriation. Some of her witnesses gave different measures. All who spoke of the Wilson Supply Ditch agreed that it was used to divert water from the headwaters of Deadman Creek, a Colorado tributary of the Laramie, into Sand Creek, from which that water, or its equivalent was rediverted at a lower point, along with other waters from Sand Creek, through the Divide Ditch and ultimately carried into the Cache la Poudre Valley. Colorado's evidence indicated that the meadow land, Skyline and Wilson Supply appropriations were earlier than the Laramie-Poudre tunnel appropriation and many of the Wyoming appropriations; and Wyoming recognized this dif-

ference on dates of appropriation, although raising some question as to the quantity of water in the earlier appropriations so recognized." (286 U. S. at p. 501; 76 Law. Ed. 1248.)

It thus appears that the amount of the appropriation of the Wilson Supply Ditch from Deadman Creek was for the first time considered in said opinion, and the amount thereof determined, and it was classed, with the Skyline appropriation, as being prior to appropriations in Wyoming. In referring to the allotment of the water between appropriators in Colorado and Wyoming, and the determination of the amount thereof, the Court said:

> "There are some existing Colorado appropriations having priorities entitling them to precedence over the Wyoming appropriations. These recognized appropriations are, 18,000 acre feet for what is known as the Skyline Ditch and 4,250 acre feet for the irrigation of that number of acres of native hay meadows in the Laramie Valley in Colorado. These recognized Colorado appropriations aggregating 22,250 acre feet are not to be deducted from the 288,000 acre feet, that being the available supply after they are satisfied. Nor is Colorado's appropriation from Sand Creek to be deducted, that creek, as we have shown, not being a tributary of the Laramie." (286 U. S. at 504; 76 Law. Ed. at 1250.)

After so stating the Court then resumes its decision concerning the tunnel appropriation, the Skyline appropriation, and the meadow appropriation, and the Wilson Supply appropriation, mentioned in the modified decree, and said:

> "Colorado and her co-defendants presented a petition for rehearing on stated grounds, one of which was that the Wilson Supply Ditch appropriation was

inadvertently omitted, in both opinion and decree, from the recognized early appropriations. As the omission was in fact inadvertent, the decree was then so modified as to include that appropriation among the others, which Colorado was recognized as having a right to continue." (286 U. S. at 506; 76 Law. Ed. at 1251.)

By this construction of the modified decree of October 9, 1922, two points were clearly settled: one, that the Wilson Supply Ditch appropriation was classed with the Skyline Ditch appropriation, and the meadow appropriation, as existing appropriations not to be deducted from the amount of water to which Colorado was entitled; and two, that the amount of the appropriation of the Wilson Supply Ditch, from Deadman Creek and its tributaries, was 2,000 acre feet per annum.

In view of these determinations it does not lie in the mouth of the complainant now to claim that under the modified decree as amplified by the decision of this Court, said ditch did not have an appropriation from Deadman Creek of 2,000 acre feet, prior to 1902; or to say that the amount of said appropriation was not adjudged to be superior to Wyoming appropriations; or charge that the diversions of water from Deadman Creek by the Wilson Supply Ditch since the rendition of said decree, have been unlawful and should now be abated, as not permitted by said decree. We contend that under said modified decree, and under the opinion and decision of this Court in the former hearing amplifying the same, as aforesaid, that the appropriation from Deadman Creek, by the Wilson Supply Ditch, both in time, amount and priority, has been definitely settled in its favor, and complainant may not now attack the same by attempting to prove otherwise. Furthermore, we contend that the evidence in this cause clearly establishes such appropriation, prior to 1902, and that said appropriation was long recognized and de-

termined by Colorado courts, by the decree entered in Colorado, on October 11, 1906 (Ex. G, R. 1275 to 1296).

Under the heading of "HISTORY OF THE WILSON SUPPLY DITCH SYSTEM, AND ITS APPROPRIATIONS OF WATER," we have given a full and complete statement of what had been done to perfect an appropriation of water for the Wilson Supply Ditch, beginning with the original filing made by Phillip Wilson, for the Wilson Supply Ditch, and of the Columbine Extension Ditch, made by Rollin Q. Tenney (in the bill of complaint herein, called the Deadman Extension Ditch), both of which were constructed as one ditch, and have always been so used. This history shows that the original owners proceeded at once to clear right of way of timber; that B. H. Eaton in 1898 entered into an agreement to purchase the two-thirds interest of Phillip Wilson, and construct the ditch; that pursuant to said purpose, B. H. Eaton, Bruce G. Eaton and R. Q. Tenney incorporated the Divide Ditch Company, to which all the parties conveyed their respective interests in said ditches; that after the right of way had been cleared of timber, by said former owners, which the testimony shows was one-half of the necessary work of construction, in April, 1901, they moved a ditch outfit onto the line of ditch, and continued the work of construction, all that year, doing rock and tunnel work, in the winter, and completed said portion of ditch, and turned the water therein, on May 9, 1902; that they immediately moved their camp to Deadman Ditch, and constructed all of Deadman Ditch, and diverted water therefrom that summer, and continued their work of construction, and built the ditch to the first small creek beyond Deadman, where they were stopped by the fall snows; that they returned in the spring of 1903, and completed said extenson ditch, beyond the second creek, in Section 23, T. 10, N. R. 75. That ever since, it has diverted water from Deadman Creek and its

tributaries and applied the same to beneficial purposes, whereby an appropriation of water therefrom was perfected, a decree confirming the same was duly made and entered, whereby Colorado recognized an appropriation therefor in the amount of 117 second feet, as of date of July 15, 1899. Said decree also awarded an appropriation of 40 second feet for Columbine Ditch, and 131 second feet from Sand Creek, or a total of 288 second feet.

(5) THE DOCTRINE OF RELATION.

Complainant in its brief contends that the Wilson Supply Ditch has no appropriation of water from Deadman Creek nor Sand Creek prior to 1902, because, as it says, no water was *diverted* prior to May 9, 1902. In so contending, counsel for complainant ignores the well established rule in all of the arid states, that the date of the appropriation relates to the date of survey of the ditch, or other acts showing intention to construct a ditch, provided the work is prosecuted with reasonable diligence to completion, and the water diverted and applied to a beneficial use. This rule is well stated in a Colorado case, as follows:

> "Although the appropriation is not deemed complete until the actual diversion or use of the water, still if such work be prosecuted with reasonable diligence, the right relates to the time when the first step was taken to secure it."
>
> Sieber v. Frink, 7 Colo. 148, at 153; 2 Pac. 901, 903.

Kinney on Irrigation and Water Rights, second edition, Section 745, adopts said rule *verbatim* and states, "We adopt this statement of the rule as the present law on the subject in all jurisdictions." Further citation of authority is unnecessary because this Court in the former case (Wyoming v. Colorado, 259 U. S. 419; 66 Law. Ed. 999) adopted this same rule, and applied the same in de-

termining what date of appropriation should be fixed for the tunnel project. In that case the owners of the tunnel and ditches connected therewith, contended that the date of appropriation should date from the year 1902, by reason of several filings made, made at that date, of an intention to make a trans-mountain diversion, not through the tunnel but by means of other ditches, and the Court held that there was no definite or certain plan of diverting the water by means of the tunnel, until October, 1909. One of the main contentions in that case was as to what date should be given under the doctrine of relation, the work not having been completed when the suit was filed, nor entirely completed when the evidence was taken; nevertheless this Court held that under the doctrine of relation the appropriation should be accorded a priority of October, 1909, and its conclusion is as follows:

> "We conclude that the appropriation should be accorded a priority by relation as of the latter part of October, 1909, when work was begun."
>
> Wyoming v. Colorado, 259 U. S. 419, at 495; 66 Law. Ed. 999, at 1025.

In this case the original filings of statements of claim by Phillip Wilson and R. Q. Tenney show a definite plan, to construct this ditch, substantially along the line upon which the filings were made, and on September 5, 1898, B. H. Eaton agreed to buy the two-thirds interest of Phillip Wilson, and build the ditch, and Rollin Q. Tenney also conveyed his interest in the extension ditch, and he and the Eatons organized the Divide Ditch Company to complete the ditch. In the meantime a large amount of work had been done in procuring right of way over government land, and clearing the right of way of timber, which the evidence shows was about half of the work of constructing the ditch. After that had been done, the Eatons moved their ditch outfit to that portion of the ditch called the Divide Ditch, in April, 1901, and began the excavation

work, and continued said work throughout that year, and in the winter of 1901-1902, they continued construction work on the tunnel, and other rock work, and completed that portion of the ditch, and turned water therein, on May 9, 1902. Immediately they moved their ditch outfit to that part of the ditch, sometimes called Deadman Ditch, being a part of the Wilson Supply Ditch, and completed it, that summer, to Deadman Creek, and diverted water from said creek. Construction work then continued to the first creek above Deadman Creek before they were driven out by the snows. They returned in the spring and completed the ditch beyond the second little creek, and as far south as the south line of Section 23, T. 10, N. R. 75; all of which appears under the head of the History of the Wilson Supply Ditch, reference to which is hereby made.

It appears from the evidence herein that the work was prosecuted under a general plan, and was completed with diligence according to said plan. That the ditch was difficult of construction, considerable portions thereof being rock work. It does appear that the date of appropriation should relate to the date of surveys and filing, or the date of the agreement in 1898 when Mr. Eaton bought the interest of Phillip Wilson and agreed to and did construct the ditch. After the right of way had been cleared excavation work was commenced in April, 1901, and thereafter was prosecuted continuously and with great diligence until completion, and water was diverted and used. The Court in Colorado fixed the date of appropriation by relation as July 15, 1899, and this Court, both in the original case and in the prior decision in this case, recognized said appropriation as earlier than 1902. Nevertheless counsel for complainant in their brief contend that the Wilson Supply Ditch never had an appropriation of any date or amount, and now has no appropriation, and that the waters diverted by said ditch from the headwaters of Deadman since 1922, have been unlawful and in diminution of the rights of the complainant, all of which

is contrary to the decisions of this Court in relation thereto, and contrary to the modified decree entered October 9, 1922, which awarded said ditch the right by reason of the then existing recognized appropriation, which rights were again confirmed in the former hearing in this cause on motion to dismiss.

X.

The Wilson Supply Ditch has Not Deprived Meadow Ditches on Sand Creek in Wyoming of Water to which They were Entitled.

As we have before shown, the Wilson Supply Ditch, or Sand Creek System of Ditches, also has an appropriation of water from Sand Creek in Colorado, as of the date of July 15, 1899. We now make reply to the contentions urged by complainant under Point VIII of its brief with respect to the rights of Colorado appropriators on Sand Creek. This Court has held in all the former hearings that Sand Creek is not a tributary of the Laramie River, but a separate stream. Counsel for complainant, in their motion to dismiss, contended that this case is a bill to enforce the modified decree of October 9, 1922, so far as it pertains to the Laramie River; and this Court in its opinion on said motion stated that this is an original suit "to enforce a decree of the Supreme Court of the United States in an earlier suit between the same States respecting their relative rights to divert and use for irrigation the waters of the Laramie River." (286 U. S. 494-5; 76 Law. Ed. 1245.)

It thus appears that the amended complaint was directed only to alleged violations of the former decree in regard to the Laramie River, and does not include Sand Creek, which this Court held in both cases, "not to be a tributary of the Laramie River." Nevertheless, without pleading the right of any appropriator from Sand Creek,

and said right, if any, not having been made an issue in this case, complainant improperly offered evidence of a general nature to show that the diversion of water from Sand Creek, in Colorado, by the Wilson Supply Ditch, had diminished the supply of certain small meadow ditches from Sand Creek in Wyoming. Such contention is advanced by the complainant in its brief, and we maintain that the evidence herein does not sustain such contention.

This question arose at the beginning of the taking of evidence, and two or three of the farmer witnesses of complainant stated generally that they were always short of water since the Wilson Supply Ditch commenced its diversion, but on cross-examination were not able to state any particular time when such shortage occurred or the amount thereof. Such general statements are of little weight in a case of this character, when specific times and amounts must be shown to sustain such contention.

It appears from defendant's Exhibit O-3 (R. 1621-2), that during the past 30 years there have been six years in which no water was diverted from Sand Creek by the Wilson Supply Ditch. If there was a shortage then, it did not occur by reason of any act of said ditch; further, there were years when the company built a channel reservoir in Sheep Creek and could not divert water because it would interfere with the work. On two other years they found it necessary to construct a cement wall to bedrock behind the earth dam, to stop leakage from the reservoir, and also to cement the face of the reservoir in connection with said cement wall, at which times no water was diverted. This accounted for failure to divert in those years. There were two years in which the Divide Ditch broke, and washed away the lower bank and bottom of the ditch, on the mountain side, so the ditch could not be used for several weeks, while being repaired. There were occasions in some years, when the Cache la Poudre River was so high, that the water commissioner would not permit diversions by this ditch, or

any of the trans-mountain ditches. During all of these times the meadow ditches in Wyoming had all the water, and if they were short, it was not by reason of the diversion of the Wilson Supply Ditch. Testimony of Bruce G. Eaton (R. 653-655). Testimony of Rex C. Eaton (R. 676-677) and Testimony of W. J. McAnelly, water commissioner in Water District No. 3 (R. 692).

Complainant's witness George Widman testified, that he was the water commissioner in charge of Sand Creek in Wyoming, from 1922 until 1930, and was deputy water commissioner in 1931. He stated that his first visit to the Eaton Ditch and to see Mr. Eaton in regard to turning down water, was on June 13, 1927, five years after he became water commissioner, which indicates there was no call to turn down water during those years. His next visit was June 2, 1928, and he called up Mr. Eaton at Greeley, and asked him if he would turn down some water for the users in Wyoming and he said he would. I did not go back there again that summer. My next visit was on June 24, 1929. On that occasion I tried to see if Mr. Eaton would turn down some water. I do not know whether he did or not, as I did not go up there again that summer. My next occasion to go up there was on June 12, 1930. The witness evidently did nothing on this occasion. His next trip was on June 23, 1930. At that time we estimated 10 sec. ft. of water in the Eaton Ditch, and they were letting 10 sec. ft. go down the creek. When I spoke to Mr. Eaton, he said he would turn down a certain amount of water to the Wyoming appropriators. I suppose he did; he never refused; he just said he would turn some water down (R. 141-144). Again he testified, in substance:

I made a request of Mr. Eaton to release water down Sand Creek, because the water rights in Wyoming were not getting their appropriations. I made such request on June 13, 1927, and again on June 2, 1928. They said they would let water down. I never went back to check up and

see whether they let it down. On other occasions they agreed to turn water down and I suppose they did. I never had any complaint. I never went back to find out (R. 884, 885).

Rex C. Eaton, manager of the Wilson Supply Ditch, since 1918, testified: He stated that on three or four occasions, the water commissioner in Wyoming had some complaint and had taken up the matter with him about turning down some water. As I remember it was once in 1928, twice in 1929, and once in 1930. I turned down water to them on those occasions. I always turned down water when requested. He also testified that Mr. Whiting, the State Engineer of Wyoming, had said to him, that we co-operated with him to a great extent in that matter. I think we got along a lot easier than we do between various claimants on the Poudre River. They have no measuring devices or headgates. They just take all the water available at their particular headgate, and that fellow floods his meadow as much as he can, and lets it run back into the creek, and the next fellow will do the same. In that way the same water is used over and over a number of times. The attention of the witness was called to complainant's Exhibit No. 1, and page 131 (R. 964) of the book where complainant's witness Burton P. Fleming stated that after the meadows were once irrigated, the return to the stream was about 95%, and witness stated that was about his estimate. I have been up and down the creek and have not seen but one headgate on these ditches, and I would not call that device much of a headgate. I have heard that there was another one but have not seen it (R. 678).

From the foregoing evidence it appears that there were only four times since 1922, when the Court entered the modified decree, and when George Widman became water commissioner, on Sand Creek, in Wyoming, that any request or demand was made for the Wilson Supply Ditch to turn down water for said meadow ditches; that in each

instance, Mr. Eaton, superintendent of the ditch, readily agreed to turn down water and said that he did turn it down; that the water commissioner said he supposed he did, and that he had no further complaint. This evidence shows that there were very few complaints by said ditches made through their water commissioner, and they made none themselves. Such complaints occur on all ditches and as the junior appropriator is entitled to the water until the senior needs it, the junior awaits the call of the senior, and then releases water, as in this case. Such procedure shows no intention of the junior to deprive the senior of his water and is the ordinary way in which such matters are handled.

L. L. Stimson, a qualified engineer, witness for defendant, testified that in May, 1933, he was employed by The Divide Canal and Reservoir Company, to investigate their ditch system in Colorado, also the various ditches taking water from Sand Creek in Wyoming. That in making said investigation he took with him two assistants, T. B. Moody, his partner, a qualified irrigation engineer, with 25 years' experience, and very expert in water matters. Also his son, a graduate in engineering of the Agricultural College of Ft. Collins, Colo., who had been his assistant since 1925, and was a proficient and experienced engineer (R. 775). He testified that he first went to the camp at Wooster Reservoir, by way of Tie Siding, and found that there was so much water along Sand Creek that it was impossible to measure the small ditches. That he found 232 sec. ft. of water at Running Water Ranch. That it was then impossible to get to the head of the Divide Ditch on account of so much snow. That men were trying to open the Divide Ditch from Sand Creek to Sheep Creek by digging a trench in the snow in the ditch. There was no water either in the ditch or Sand Creek, because it was frozen. That the elevation at that point was 9,000 feet and there was no water running at that elevation anywhere (R. 776).

That he went up with his assistants on May 20, 1933. By that time the amount of water in Sand Creek at the Colorado-Wyoming line had fallen to 70 sec. ft. That he tried to get to the Divide weir, but had to walk 4 or 5 miles and then found no water running because it was still frozen at the head. By that time the snow had receded on the Laramie plains, and the meadow ditches in Wyoming were taking water, but at the head of the Divide Ditch, they did not succeed in opening the ditch until June 3, 1933 (R. 776).

Complainant had offered in evidence its Exhibit No. 85 (R. 1160-1200), purporting to be the decreed appropriations of Sand Creek, and other creeks, in Wyoming. This decree is in the nature of an order, entered by the board of control of Wyoming, on Nov. 19, 1929, and each sheet thereof purports to be a decree for the ditch named therein. A part of these ditches take water from Sand Creek while others take from three or four other creeks whose appropriations would not be affected by the diversions of water by the Divide Dam. These various certificates are compiled in part on pages 52 and 53 of complainant's brief, but same omits several important facts pertaining to the appropriations of water, viz.: it fails to set forth the number of acres of land irrigated or permitted to be irrigated; they also omit the following provision of said decrees:

> "Appropriations are limited to the amount of water which is actually applied to beneficial uses which in the case of irrigation cannot exceed one cubic foot per second of time for each 70 acres of said land" (R. 1163).

Witness stated that he first figured up the number of acres of land stated in the permits or decrees of the ditches from Sand Creek proper, and found the total acreage therein stated was 4,840 acres, and that the total of the appropriations therefor was 70.73 sec. ft. That when he had surveyed the land actually irrigated under said ditches,

or that could be irrigated from them, he found only 2,980 acres (R. 777). This amount is 1,823 acres less than stated in said decrees. As the maximum amount of water is fixed at one second foot for 70 acres, it would require only 42 sec. ft. to irrigate the land actually irrigated, and that would be the limit of the amount of water required under the provisions of said decrees.

This witness testified that he and his associates proceeded to measure the irrigated lands under each ditch and the amount of water being diverted by each ditch, the amount of water in Sand Creek, at the Wyoming line, the accretions from all sources, and the diversion from all sources, and the amount of increase and decrease, between stations, and the final result obtained at the end of Sand Creek. That they prepared a map, defendant's Exhibit E-2, which is shown (R. 1547), which map shows the result of their investigation and was used by witness in explaining his testimony as to what they ascertained. Witness testified that he established seven measuring stations on Sand Creek, beginning at the Wyoming line and ending at the terminus of Sand Creek, near the Laramie River. That he used letters to designate the stations on the map and the point of measurement is indicated by a double circle. The first or upper station is marked "measuring station A," and is located close to the Wyoming line, in Sec. 13. The next station "B" is located in Sec. 25 near head of Lone Tree Ditch; the next is "C," located in Sec. 11 by a bridge on county road; the next is "D" in Sec. 26; the next is "E" in Sec. 19; the next is "F" west of Creighton Lake; and the last is "G," a short distance south of the Laramie River. After establishing said stations I measured the water at each station with a current meter, and marked the station with a stake. There was considerable diurnal fluctuation because of freezing at night and melting in day-time (R. 783-784). This witness further testified in effect:

In making our measurements of water in the creek we started at station "A," where we found 69.87 sec. ft. on May 30, 1933. There was an accretion from Running Water Creek of 2.23 sec. ft., which made the total 72.10 sec. ft. of water, between stations "A" and "B." In this section, Collins Ditch No. 1, was diverting 13.64 sec. ft., and Collins No. 4 Ditch 7.83 sec. ft., Knold Ditch 8.4 sec. ft., which made a total diversion of all ditches in that section of 32.87 sec. ft. We measured all the water in Sand Creek at the end of that station, and there was 70.51 sec. ft.; in other words, the diminution of the waters of Sand Creek from station "A" to "B" was only 1.59 sec. ft., although 4 ditches had diverted 32.87 sec. ft., from the creek. The result was accounted for by the fact that the ditches were close to the creek and that the water diverted returns very quickly and finds it way back to the stream. A very large part was running back on the surface of the ground and the rest was returning through the sub-soil and gravel. The meadows are cut up with depressions which lead back to the stream and when the water is turned out of the ditches, it finds its way into these depressions, and back to Sand Creek, as water running on the surface of the ground (R. 784-785).

We measured the water in the creek at each of the other stations and all additions from any source, and all diversions by the ditches, from station "A" to station "G." Starting with 69.87 sec. ft. at station "A," and when we arrived at station "G" there was only 1.24 sec. ft. less water than when at station "A" (R. 786). A photograph of the method of irrigation of meadows was taken near the head of Red Ditch, which is Exhibit N-2 (R. 1555). This picture was taken the first week in June and correctly shows the situation and is a fair representation of the method of irrigating meadows by these ditches on Sand Creek (R. 768).

On June 17 and 18, 1933, we returned when there was less water in the creek, and took measurements at stations

"A," "C" and "F.". There was 23.96 sec. ft. in Sand Creek at station "A" and the accretion from Running Water Creek was one-half of a second foot, and from Alkali Creek 3.72 sec. ft., making the total water 28.18 sec. ft. At that time there were 8 ditches diverting an aggregate of 39.91 sec. ft. between stations "A" and "C," and 25.05 sec. ft. were left in the creek. In fact all the water had returned except 3.13 sec ft. (R. 787).

We measured from station "C" to "F." Starting with 19.8 sec. ft. at station "C" and found that 10 ditches diverted an aggregate of 34.21 sec. ft. of water and at station "F" there remained in the creek 2.19 sec. ft. The total amount diverted by the ditches for the entire distance was 64.22 sec. ft., although the amount at station "A" was only 28.19 sec. ft. (R. 787-788). This shows that it requires only a small amount of water to satisfy these diversions.

There was quite a large ditch diverting from Sand Creek but on inquiry could not find its name so named it "unknown ditch." It is located near the north line of Sec. 2, T. 13, N. R. 75. It is shown on map. This ditch has a very good concrete dam and is such that it can divert all of the waters at that point. A picture was taken of its headgate, defendant's Exhibit O-2 (R. 1556). Inquiry was made of the water commissioner, Mr. Widman, and he did not know the name of the ditch. And also at the State Engineer's office in Cheyenne and they informed me there was no such ditch; that they had no record, permit or map showing the same. The first time this ditch was diverting 12.5 sec. ft., and it was being carried over into the Antelope country, so none of the water would return to Sand Creek. The second time the amount of water being diverted was .84 sec. ft. (R. 789).

A few of the ditches had some sort of headgate, some had make-shift dams, but none had weirs. There was no means of measuring water in any of these ditches except

it could be done by meter measurements. Witness stated (R. 790) that he made photographs of the heads of the Nedart Ditch, Red Ditch, Cook Ditch, Braden Ditch and other ditches, which show entire lack of headgates or measuring devices. These photographs are defendant's Exhibits P-2, Q-2, R-2 and T-2, and same are shown (R. 1558-1562).

This witness testified that when he was making said measurements the James Hardman Ditch No. 2, the LeRoy Ditch, the Davis Brothers No. 2 and Alice Hardman Ditch, and Davis Brothers Sand Creek No. 2 Ditch, were all drawing water, in the aggregate of 16.8 feet or more. These are the same 4 ditches concerning which Bruce G. Eaton testified that he had purchased the farms with said ditches and appropriations of water and resold the land in 1906 and 1907, but in his deeds therefor, he specifically reserved the appropriations of water, and thereafter diverted said appropriations at the Divide Dam (R. 769-774). The deeds conveying said lands and water rights to Mr. Eaton are Exhibits X-1, Y-1, and Z-1 (R. 1525-1527, 1529). The deed from Bruce G. Eaton to Lemuel E. Cook is dated Nov. 24, 1906, and specifically reserves the water rights and appropriations for the lands sold him, Exhibit A-2 (R. 1533). The deed from Bruce G. Eaton to Franklin P. Mason dated Dec. 20, 1907, conveying land but reserving the water rights and appropriations of water is Exhibit B-2 (R. 1535). The deed from Bruce G. Eaton to James M. Hoge, Exhibit C-2, reserving the water rights and appropriations of water is shown (R. 1539). The water rights and appropriations of water so reserved have since said deeds been transferred and diverted at the Divide Dam. These sales with reservations of water and transferred to the Divide Dam, separated said water from said land, and diminished the amount of water necessary to irrigate the lands from Sand Creek in Wyoming.

As we have before shown by reason of there being only 2,980 acres of land actually irrigated, the total amount of priorities of these ditches was reduced from 70 sec. ft. to 42 sec. ft., under the restriction of one sec. ft. for 70 acres of land. Deducting the 16.8 sec. ft. reserved in said deeds, would leave about 25 sec. ft. as the amount required for the remaining ditches, which is practically the amount witness Stimson found was sufficient to irrigate all of the lands under said ditches, and leave a residuum after all of said ditches were fully supplied. The record shows that if at any time these ditches were short of water and requested Mr. Eaton to turn down water to them, which the evidence showed only occurred four times in the eleven years, he always turned down the water. These demands occurred when there was little water in the creek and he gave them all there was.

Oda Mason, witness for complainant, on rebuttal testified that he became owner of the Hoge land which Bruce G. Eaton had conveyed, reserving the water; also that his father, Franklin P. Mason, acquired lands from Bruce G. Eaton and by the deed the water rights were reserved. This witness testified that all these years he had known that Mr. Eaton had reserved appropriations of water by said deeds, and that applied not only to his own but his father's lands. That everyone in the neighborhood was familiar with the reservations in the deed, and that Eaton had diverted the said appropriations of water at the Eaton dam; that he knew that the water had been reserved and transferred in 1907 (R. 888-889). "When I bought my land I understood the water rights had been reserved by Eaton, and he was diverting it at the Divide Ditch." He stated that he had used water continuously on his land and claimed it was the old priorities for said ditches, and admitted he was unlawfully diverting the same, well knowing that appropriations and priorities had been reserved by Mr. Eaton in said deeds (R. 891-892).

Not only this witness but all purchasers of said land had constructive notice of said reservations by the records of said deeds and had actual knowledge of said reservations. Whatever was reserved they never acquired or owned, and the title to said reserved water rights remained in Mr. Eaton until he conveyed the same to the company. If the owners of said lands subsequently diverted and used water from said four ditches, it must have been under a new appropriation, and of a date later than 1907, and such appropriations, if any there be, are junior to that of the Wilson Supply Ditch, and it is not required to turn down water for said after-acquired appropriations.

At the time when these deeds were made and the appropriations of water for these four ditches were specifically reserved therein, it was the rule under the laws and decisions of the Supreme Court of Wyoming, that a water right was property, distinct from the land on which it had been used; that it could be sold separate from the land; that it could be changed to a new point of diversion, and a new place of use. Therefore, the reservations in said deeds of said appropriations of water, were reservations of property, distinct and separate from the lands sold, and that the property rights so reserved, could be taken and used elsewhere. It was lawful to reserve said water rights, and the purchasers by accepting deeds with said reservations acquired no appropriations of water for said land, nor could they lawfully resume the use thereof on said land when they knew that same had been transferred to the Wilson Supply Ditch, and had been used there, now for more than 25 years. What is reserved in a deed is never conveyed thereby, and the purchaser never acquired any right to the property so reserved.

Frank v. Hicks, 4 Wyo. 502, 528; 35 Pac. 475, 480.

McPhail v. Forney, 4 Wyo. 556, 560; 35 Pac. 773.

Johnston v. Little Horse Creek I. Co., 13 Wyo. 208, 226; 79 Pac. 22, 24.

Groo v. Sights, 22 Wyo. 19, 30; 134 Pac. 269, 272.

In the first two cases above cited, the Wyoming Supreme Court fully discussed the nature of a water right, and held it was property; that the land was one kind of property, and the water right a separate kind of property; and that water rights can be severed from land where formerly used.

In Johnston v. Irr. Co., *supra*, the Court again reviewed and discussed the nature of a water right, or an appropriation of water, and held that it was property separate from the land and referred with approval to the two former cases. In that case the Court was called upon to determine the effect of the then Wyoming statute, and rulings of the State Engineer, and other water officials on the question; and the Court specifically held that the State Engineer and water officials were without authority to rule that the water rights were not severable from the land and further held that there were no provisions of the statutory law prohibiting severing the water rights from the land, and that their adjudication act did not have that effect; and concerning an act of the legislature passed in 1909, being Session Laws of 1909, Chapter 68, Sec. 1, which it was claimed in that case made the water right inseparable from the land, the Court said that the legislative attempt to change the settled rule should be clearly expressed and expressed a doubt whether the statute was sufficiently clear in that respect. So that it seems to be yet unsettled whether the legislature has power to say that a water right which is property cannot be separated from the land where originally used. In any event water rights reserved in

these deeds were reserved prior to the enactment of said statutes and the change of point of diversion from said four ditches to the Wilson Supply Ditch had been made in conformity to the then existing rule prior to 1909.

In this case, neither the present owners of the lands conveyed, from which the appropriations of water were reserved, nor their grantees, can lawfully claim that they are now the owners of the old original appropriations of water. They bought the lands from Mr. Eaton at a reduced price, not half of what he paid for the lands and water rights, because Mr. Eaton desired to and specifically reserved the water rights, and all purchasers knew it. Having so purchased the lands without water, equity will not permit them to now assert that they own the old original appropriations of water, and thereby seek to deprive Mr. Eaton and his irrigation company of the use and enjoyment thereof, in the Wilson Supply Ditch, where they have used the same, since 1907.

If his grantees of the land have been diverting water at the head of the old ditches, such acts are unlawful, because they never owned the old appropriations. If they have any rights to the use of water in said old ditches, their rights are those of an appropriator junior to the Wilson Supply Ditch, and also junior to the other ditches on Sand Creek in Wyoming, and they, not the Wilson Supply Ditch, have been interfering with the lawful rights of the other ditches; and they should be closed down prior to any call on the Wilson Supply Ditch. He that seeks equity should do equity, is one of the familiar rules that can well be applied here.

XI.

The State of Wyoming has No Just Cause for Complaint If the Alleged Decrease in the Annual Stream Flow of the Laramie River at the State Line is Due to Natural Conditions, and Not to Increased Uses of Colorado Appropriations, Beyond the Amount Allocated by the Decree of This Honorable Court.

Complainant's brief contains a subdivision, Point VII (pp. 41 to 50), with the caption, "Water Supply," and at page 45 of this subdivision, it is said:

> "The question at issue in the case at bar is not to determine what the available supply is, but to determine if Wyoming is being denied any water that is available to which she is entitled under the former decree, by reason of Colorado taking more than she is lawfully entitled to. The available water supply to meet the demands of both Colorado's recognized appropriations and Wyoming's appropriations is not now open to question."

We are in full accord with this statement. Whatever variations there may be in stream flow will not affect the amount of water to be diverted by Colorado, as a matter of right under the decision of this Court.

> Wyoming v. Colorado, 259 U. S. 419; 66 L. Ed. 999.

We have elsewhere discussed in this brief the question at issue, i. e., whether or not Colorado has materially and substantially injured Wyoming by the diversion of more water from the Laramie River than she may lawfully do under the decree of this Court. The question has been discussed in detail with respect to the several appropriations within this State. Apparently, Wyoming, by showing a decrease in the flow of the river during the last ten years, seeks to raise an inference that the reason for the

depreciated water supply is because of excess diversions in Colorado. The burden, however, is upon Wyoming to prove this fact.

Wyoming's water shortage from the Laramie in recent years, like that of Colorado, and like that of all the eastern slope of the Rocky Mountains, has been due to other causes than Colorado's diversions of water from the Laramie River. It is now common knowledge that a series of years of protracted drouth prevailed in the years involved over the watershed of the Missouri River, unprecedented in duration and in severity (R. 866).

In the former case of Wyoming v. Colorado, 259 U. S., at 485, and in the later case, 286 U. S., at page 503, this Court found:

> "That at Woods (Wyoming) a gauging station near the Colorado-Wyoming state line the natural flow of the Laramie, after the recognized Colorado appropriations are satisfied, is such as to afford an available supply of 170,000 acre feet per year, but not more; that the stream receives below Woods contributions of 93,000 acre feet from the Little Laramie and 25,000 acre feet from smaller affluents, making the entire available supply 288,000 acre feet, apart from the quantities required to satisfy the recognized Colorado appropriations; * * *."

Complainant in an attempt to show (1) that the average annual flow of the Laramie River has largely decreased since the entry of the decree in the former case, and, (2) that such decrease below the available supply, as found by the Court in the 1922 decree, was due to unlawful increased used by Colorado appropriators, introduced Exhibits 35 and 54, prepared respectively by witnesses Nelson and Meeker (R. 224, 267 and 1006, 1060).

It will be noted that the table contained in Exhibit 35 covers the period 1911 to 1932, and is divided into two

parts, one from 1911 to 1924, inclusive, and the other from 1925 to 1932, inclusive (R. 1006). The mean, as there appears, for the partial period 1911 to 1924 is 168,000 acre feet, which amount is then "used as a yardstick" to measure the runoff for all the other years. This indicates according to this method of calculation that between 1925 and 1932, the total water supply at Woods Station in Wyoming was 128.4% of 168,000 acre feet less than it would have been had the runoff been of the same character as occurred during the 1911 to 1924 period. The fallacy of including the years of exceptionally low runoff, namely 1925, 1930, 1931 and 1932, in such a short period as that of 1925 to 1932 is manifest, and such method results in distorting and unduly increasing the percentage of deviation from the mean or average runoff (Testimony R. J. Tipton. R. 867-868).

In assessing the value to be placed upon complainant's Exhibit 35, witness Tipton says:

> "It could not properly be inferred from (this exhibit) that the large indicated deficiency of 128.4% occurring from 1925 to 1932, and based on the 1911 to 1924 mean was due to excessive uses or unlawful uses, of the Laramie River water by Colorado appropriators" (R. 868).

In this connection, attention is called to the assertion made by counsel for Wyoming at page 43 of its brief that witness Tipton states: "That Colorado uses are increasing."

That such partial statement is obviously misleading clearly appears when the complete sentence is examined and which reads:

> "There is no question but what some of the decreased flow was due to increased uses by Colorado users, since the Laramie-Poudre Tunnel has gradually increased its diversions, but as yet those

diversions have not reached the 15,500 acre feet allocated to the Tunnel by the Court" (R. 868).

In order to show that the decrease in the mean runoff at Woods on the Laramie, thus ascertained by the same method of calculation, was not alone confined to the Laramie River, reference is here made to defendant's Exhibit Q-3 (R. 1624), and the testimony of witness Tipton at page 870. This Exhibit indicates that by using the mean runoff for the period 1911 to 1924, as a "yard stick," the accumulated deficiency from 1925 to 1932 in the Cache la Poudre Basin was 145.1% as compared to the accumulated deficiency in the Laramie River Basin of 128.4% as indicated in complainant's Exhibit 35 (R. 870).

Likewise defendant's Exhibit R-3, prepared in exactly the same manner as complainant's Exhibit 35, with respect to the Arkansas River the next major stream rising in Colorado on the east side of the Rocky mountains, shows that the accumulated variation from the 1911 to 1924 mean to have been 159.3% as compared with the accumulated deficiency of 128.4% in the Laramie River Basin (R. 1624 and R. 871).

And defendant's Exhibit S-3, at page 1625 of the Record, which was prepared in the same manner as complainant's Exhibit 35, indicates an accumulated deficiency at the end of 1932, on the Rio Grande River in Colorado, based on the mean for the period 1911 to 1924, to be 113.8% compared with accumulated deficiency of 128.4% in the Laramie River Basin (R. 872).

Thus it appears that on all the major streams in Colorado, namely the Cache la Poudre, the Arkansas and the Rio Grande River, as indicated by defendant's Exhibits Q-3, R-3 and S-3, respectively, the source of which was substantially the same as the Laramie River, there was an accumulated deficiency of approximately the same percentage covering the same period of time. Furthermore,

such deficiency was in each instance not due to increased uses, but to a period of low runoff covering all the Rocky Mountain area.

The testimony of witness Tipton (R. 874), which is based upon defendant's Exhibit J-3 (R. 1615), shows that Colorado users had only 86% of the aggregate allocation of 37,750 acre feet in the period 1925 to 1932, while the Wyoming users had available to them out of the Laramie River an average during the same period of 97% of the 154,500 acre feet, the same being the long time mean (Complainant's Exhibit 54, R. 1060 and R. 874).

We respectfully submit that Wyoming wholly failed to prove a substantial and material diminution in the water supply, to have been caused by Colorado or by any of her appropriators.

CONCLUSION.

It is, therefore, respectfully submitted, for the reasons hereinbefore set forth, that the State of Wyoming has failed to sustain the allegations contained in her amended Bill of Complaint, and that the same should be dismissed and the State of Colorado recover her costs herein expended.

Respectfully submitted,

PAUL P. PROSSER,
Attorney General
of the State of Colorado,
SHRADER P. HOWELL,
Assistant Attorney General
of the State of Colorado,
Solicitors for Defendant.

C. D. TODD,
WILLIAM R. KELLY,
LAWRENCE R. TEMPLE,
WILLIAM A. BRYANS, III,
Of Counsel.